BUREAU OF HYGIENE AND TROPICAL DISEASES.

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HELMINTHIASIS.

ABAZA. **Note on Parasitic Infection in Alexandria.**—*Jl. Egyptian Med. Assoc.* 1929. Oct. Vol. 12. No. 8. pp. 149–154.

Persons always resident in Alexandria and without symptoms suggesting parasitism were chosen to the number of 1,093. The method of examination is unstated. Apparently the urine was examined in these and schistosome eggs found in 182; 163 had urinary eggs of *S. haematobium* and 15 of *S. mansoni*. Stool specimens numbered 1,025 and showed infection as follows: Ascaris 386, trichuris 156, *H. nana* 101, enterobius 41, hookworms 38, *S. mansoni* 28, *S. haematobium* 1, trichostrongylus 6, *T. saginata* 5, strongyloides 1. Cases free from infection numbered 390, so that infection was detected in 64·4 per cent. of the population. *Planorbis boissyi*, *Bullinus contortus* and *B. dybouski*, all intermediate hosts of schistosomes, were present in the city. Schistosome and ascaris infections were commonest in pupils of private preliminary schools.

Clayton Lane.

ZSCHUCKE (C.) & NAJERA (L.). Importancia del parasitismo intestinal en Fernando Poo. [**The Importance of Intestinal Parasites in Fernando Po.**]—*Medicina Países Cálidos.* Madrid. 1929. Nov. Vol. 2. No. 6. pp. 541–551. [18 refs.]

The authors examined the faeces of 328 patients by the Kofoid and Barber technique in the hospital of Santa Isabel. 310, or 94·51 per cent., contained ova of hookworm, 66·46 per cent. those of trichuris, and 55·18 per cent. ascaris; only two specimens contained no ova. Sixty-five, or 19·81 per cent., were single infections, 263, or 80·19 per cent., had more than one. No appreciable difference was detected between the indigenous inhabitants, those of Spanish Guinea, and those of the neighbouring colony of the Cameroon. The maximum number of hookworms found was 321, and the average among 63 persons treated was 56; Necator was much more numerous than Ancylostoma, in a proportion of 98·97 to 1·03 per cent. in this series and 98·5 to 1·5 in another of 247 sick. Nevertheless, it is stated infection is not severe enough to account for the high mortality; this is ascribed to trypano-

somiasis and, in consequence, it would be a grave mistake to relax efforts against the latter in favour of a campaign against the former. [There is no suggestion that they might both receive attention.] Counted by Stoll's method, modified so that 0·1 cc. was examined in place of 0·15 cc., it was found that every female hookworm recovered corresponded to 119 eggs per gram of faeces, or since the number of females and males were 447 and 149 respectively to 90 eggs for each worm.

H. Harold Scott.

ROBERTSON (Russell L.). **Notes from Garkida Hospital.**—*West African Med. Jl.* Lagos. 1929. Apr. Vol. 2. No. 4. pp. 183–184. With 1 chart.

Faecal examinations conducted on 175 hospital patients at Garkida, Nigeria, showed ova of *Schistosoma mansoni* in 54, of hookworms in 35, *Taenia saginata* onchospheres in 53 and Strongyloides larvae in 1. In 227 schoolboys about 12 years of age, schistosome ova were found in 87 (*S. haematobium* in 22 and *S. mansoni* in 68). Both species were found in the same urinary specimen once and in the same faecal specimen once. *Taenia saginata* onchospheres were found in 52, hookworm ova in 33 and ascaris once only. More than two species of intestinal parasites were found in 5 and the percentage of intestinal parasites was 67·8. The diagnostic technique is not mentioned.

C. L.

LE GAC. Parasitisme intestinal au Ouadaï (Tchad). [**Intestinal Parasitism in the Chad District.**]—*Ann. de Méd. et de Pharm. Colon.* 1928. Apr.–May–June. Vol. 26. No. 2. pp. 210–215.

On the basis of 2 smears per stool 66·45 per cent. of 2,512 persons were found infected with worms. Details are: *S. mansoni* 1·91, *T. saginata* 16, *H. nana* 0, ascaris 6, strongyloides 9·79. *Ancylostoma duodenale* is the most frequent intestinal parasite [figures not given], necator has not been found, trichuris is rare, enterobius has been found several times, multiple parasitism is frequent.

C. L.

ROSS (P.). **Some Observations on Malaria and Helminthiasis in the Central Kavirondo Reserve adjoining Kisumu.**—*Kenya & East African Med. Jl.* 1929. Feb. Vol. 5. No. 11. pp. 367–374.

Of 675 persons examined 282 were found infected as judged by the "fallible method of smear examination" of faeces. Ascaris eggs were found in 219, hookworm in 20 and trichuris in 21. Taenia onchospheres were seen in 58 and in one village in 15 per cent. of those examined. In another place 40 of 50 children examined were infected. Ova of *Schistosoma mansoni* and of *S. haematobium* and larvae of *Strongyloides stercoralis* were rarely seen.

C. L.

BRISCOE (R. C.). **Incidence of Helminths in Kitui District.**—*Kenya & East African Med. Jl.* 1929. Sept. Vol. 6. No. 6. pp. 175–176.

The diagnostic method is unstated. In-patients, examined apparantly as a routine, numbered 528 in all, and 357 infections were found in them, namely *T. saginata* 163, ascaris 85, hookworm 71, enterobius 12, trichuris 11, *S. mansoni* 17, *H. nana* 3, strongyloides 4, *C. sinensis* 1, *T. solium* 1, *T. confusa* 3. Of the schistosome cases 8 had no symptoms.

C. L.

ADVIER (M.). Les helminthiases chez le Malgache en Emyrne. [**Helminths among Malagasies.**]—*Bull. Soc. Path. Exot.* 1929. May 8. Vol. 22. No. 5. pp. 390–393.

This report has as its basis 4 to 8 weekly examinations each of at least four preparations, evidently smears. Of 600 persons examined 450 were parasitized. Percentages are : Ascaris 56, trichuris 41, hookworms 20, trichostrongylus 1 (that is six times), *Taenia saginata* eggs once only, although treatment for the worm is not infrequently demanded locally. Three cases had eggs of *Schistosoma mansoni*, 7 had eggs believed to belong to *Dicrocoelium lanceatum*. Quadruple infestation occurred twice ; triple 45 times, *Hymenolepis nana* being present in one case ; double 174 times.

C. L.

KOBAYASHI (Harujiro), CHIBA (Eiichi) & FURUYAMA (Toshio). **On the Incidence and Degree of Infestation with Hookworm and** *Trichostrongylus orientalis* **in Keijo (Seoul), Chosen.**—*Acta Med. in Keijo.* 1929. Vol. 12. No. 2. pp. 66–71. [5 refs.] [Parasit. Dept., Imperial Univ., Keijo.]

This paper summarizes work which has mostly appeared only in Japanese. Examination was by faecal smear and by culturing in powdered peat. One series of smear examinations on Korean soldiers illustrates [facts apt to be forgotten] the influence of the extent of faecal examination on the ascertained incidence of infection. Its salient points are tabulated here. Smears were made on six occasions on 185 men, and showed the following infections :—

	Ascaris.	Trichuris.	Hookworm.	*T. orientalis.*	Taenia.	*C. sinensis.*
Detected after 1 smear ...	147	168	83	19	6	6
Detected after 3 smears ...	149	177	111	28	12	8
Detected after 6 smears ...	149	179	129	41	18	18
Culture ...	—	—	134	50	—	—

Trichostrongylus is usually associated with hookworm infection, suggesting a common mode of infection. " Our culture method, the

powder peat method, seems to be convenient and economical; still we lack a comparative study accurately carried out with other culture methods or egg enriching methods. We are now engaged in such a study."

C. L.

ISHIKAWA (S.). **On the Results of Repeated Faecal Examinations of Japanese and Chinese In-Patients of the Hospital, Manchuria Medical College, and Results of Examination of Faeces of Mongolians.**—*Jl. Oriental Med.* 1929. Nov. Vol. 11. No. 5. pp. 142–143. [Manchuria Med. College, Mukden.]

Stools of 316 Japanese and 308 Chinese were examined three times each " by the coating method and by Yaoita's precipitation technique." The percentages of infections found in Japanese and Chinese respectively were: Ascaris 36·7 and 49, trichuris 37 and 9·5, hookworms 10·1 and 6·8, trichostrongylus 3·1 and 2. There were single finds of *M. yokogawai*, *H. nana*, *T. saginata* (segments) and enterobius. In 234 Mongolians examined once only, the percentages of finds were: Ascaris 60·3 and trichuris 1·6. There were 11 cases of taenia found (segments 3, onchospheres 8) and 1 of enterobius.

C. L.

SUZUKI (S.). **Study of the Distribution of Human Parasites in the Agricultural Districts of Formosa and of the Relation of Infestation to Age, Sex, Occupation, and Topography.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. July. No. 292. [In Japanese. English summary pp. 33–34.]

Examination of 40,000 faecal specimens (technique unstated) places the district of Taichu with the highest infection rate in Formosa. For ascaris the percentage is 92·77, for hookworms (" Ankylostoma duodenale ") 59·6. The guineaworm rate is 95·7, which, however, does not leave much room for the conclusion that it " preys much more upon the young between the ages of 5 and 15 than upon the aged," and that it preponderates in women. Hookworms specially infect persons between the ages of 15 and 20, and males more than females. Ascaris infects women more than men.

C. L.

CORT (W. W.), SCHAPIRO (Louis), RILEY (W. A.) & STOLL (N. R.). **A Study of the Influence of the Rainy Season on the Level of Helminth Infestations in a Panama Village.**—*Amer. Jl. Hyg.* 1929. Nov. Vol. 10. No. 3. pp. 626–634. [10 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

The method of examination was by 1/200 gm. of faeces in Stoll's caustic soda. The conclusions are as follows:—

" Series of egg counts were made in a village in Panama at the beginning, middle and end of the rainy season. There was no evidence of any increase of hookworm infestation over the seven months of the rainy season, suggesting that in this region there is no considerable loss of worms during the four months of the dry season. The trichuris level was also about the same for the three series of counts. There was, however, a very remarkable increase in the ascaris counts in the third examination as

compared with the first and second. This was especially evident in the worst 'ascaris families' where the conditions were evidently very favorable for the spread of this parasite. This suggests that there is a considerable fluctuation in the level of ascaris infestation during the year in a region with a dry season of any considerable duration."

C. L.

LABERNADIE (V.) & MARNEFFE (H.). Etude sur le parasitisme intestinal à Cayenne. [**Intestinal Parasitism at Cayenne.**]—*Bull. Soc. Path. Exot.* 1929. July 10. Vol. 22. No. 7. pp. 568–584. [11 refs.]

These faecal examinations, apparently by smear, cover many thousand persons from 1914 to 1927. The three main intestinal parasites are ankylostomes, ascaris and trichuris. Hookworms in 1926–27 were found in 94 per cent. of convicts and 61 per cent. of the free population, while the corresponding figures for ascaris were 12 and 53, and for trichuris 32 and 82. In children, percentages of infection as between 1 and 15 years rise for hookworms from 0 to 26, and for trichuris from 14 to 35, whereas for ascaris they fall from 78 to 33. Strongyloides larvae, it is held, have formerly been identified when ankylostome larvae were concerned, these having hatched within a few hours of the passage of the stool. *S. mansoni* eggs were found 65 times, but on no occasion in one who had never left the country. Eggs of the strongylate type 100μ to 120μ long by 50μ to 80μ wide with 2 to 4 blastomeres are occasionally found [the suggestion made that they belong to *Heterodera radicicola* can scarcely be correct]. Treatment following diagnosis is advised.

C. L.

FABRE (Henri J. A.). Sur le parasitisme intestinal à la Guadeloupe. [**Intestinal Parasitism in Guadeloupe.**]—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 671–673. [Lab. of Hyg. & Bact., Pointe-à-Pitre, Guadeloupe.]

Of 472 stools submitted to the Laboratory of Hygiene and Bacteriology at Pointe-à-Pitre because there was some gastro-intestinal trouble, parasitism was found in 271 (57·5 per cent.). Detailed percentages were: Trichuris 44·3, ascaris 27·4, *Schistosoma mansoni* 14·8, *Necator americanus* 5·5, *S. stercoralis* 4·2, threadworms 1·6, *Hymenolepis nana* 0·2. There were also "*Amoeba dysenteriae*" 1·8 and "*Amoeba coli*" 0·2.

C. L.

GAMBLE, Jr. (W. G.). **Intestinal Parasites in Eastern Carolina.**—*Jl. Amer. Med. Assoc.* 1929. May 4. Vol. 92. No. 18. pp. 1516–1518. [4 refs.]

Of 3,101 persons examined as a routine measure, 17·6 per cent. were infected witth intestinal parasites. Of those examinations in which the technique is mentioned, a plain smear was used in about a third, a smear and a "brine method" in about two-thirds. Tables show the finds: (1) of ova (in which *E. histolytica* is included), and (2) of parasites which include *Strongyloides stercoralis* and *Giardia lamblia*. They were as follows: A. Whites: Hookworms 382 and 16, ascaris 21 and 19, enterobius 17 and 20, *T. saginata* and 4, trichuris 2 and 0, *S. mansoni*

2 and 0 ; and also *E. histolytica* 2, myiasis 2, and strongyloides 3. B. Coloured persons : Hookworms 29 and 0, ascaris 21 and 1, enterobius 1 and 2, and also *G. lamblia* 2 and *E. histolytica* 1.

C. L.

KRJABIN (K. I.), SCHULZ (R. Ed.), SSERBINOFF (P. I.) & SMIRNOFF (G. G.). Ergebnisse der Expedition zur Erforschung der Helminthosen der Kohlengrubenarbeiter der Donjetzhöhenkette. (25. Helminthologische Expedition der U.d.S.S.R. 1925.) [**Helminth Infestations of Coal Miners, Donetz (Ukraine).**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. June 28. Vol. 112. No. 6/8. pp. 454–458. [8 refs.]

The number of diagnostic examinations made was 7,490 on 7,234 persons. The technique is unstated. No case of ankylostomiasis was found and only one of strongyloides infection. Trichuris was found in 22·8 per cent. of coal mine workers, in 8·94 per cent. of members of their families, and in 15 per cent. of salt workers ; in the last group were also found thread worms, *Hymenolepis nana* and *Dicrocoelium lanceatum.* In brick kiln workers ascaris infection was 24·6 per cent. There were also reported *Rhabditis donbass* and *Rh. schachtiella, Opisthorchis felineus, Fasciola hepatica, Taenia saginata.* Investigations were also carried out on animals.

C. L.

PLOTNIKOV (N. N.) & SERTSCHANINOV (L. K.). Zur Frage der Verbreitung der Eingeweidewürmer unter den Kindern der Stadt Swerdlowsk und Blutveränderungen bei diesen Infektionen. [**Intestinal Worms among Children of Swerdlowsk (? Government of Saratov).**]—*Rev. Microbiol., Epidemiol. et Parasit.* 1929. Vol. 8. No. 2. pp. 160–168. [19 refs.] [In Russian. German summary p. 226.]

These children, who were examined two or three times, numbered 245 and were from 6 to 12 years of age. Percentages found infected were : Enterobius, 33·8 ; ascaris, 18·3 ; trichuris, 10·6 ; trichostrongylus, 7·8 ; taenia, 7 ; *H. nana,* 2·5. Infection with worms lessened the number of monocytes, but was without influence on other blood corpuscles, red or white, except the eosinophils, which were increased often at the expense of neutrophils.

C. L.

DUBROWINSKI (S. B.), KRANZFELD (A. M.), ROSENFELD (W. D.) & SALAMANDRA (E. G.). Ueber die Verbreitung der parasitischen Würmer bei verschiedenen Bevölkerungsgruppen in Moskau und die Wege der medizinischen Helminthologie. [**Distribution of Parasitic Worms in Moscow.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. June 28. Vol. 112. No. 6/8. pp. 481–496. With 1 fig. [31 refs.]

In 2,879 persons the stool was examined by Fülleborn's Hamburg coverglass method, and in 757 the rectal mucus was obtained and examined, but in 576 of the latter both methods were used. The percentages of infection by the former were : Ascaris 30, trichuris 20, enterobius 14, and trichostrongylus 2. Ankylostomes were found 33 times in Turkomans and twice in Chinese. The percentages of cestodes were

H. nana 3, *Taenia* sp. 0·3, diphyllobothrium 0·1. The rectal mucus showed a 72 per cent. infection with enterobius, though it was in certain institutions 100. Infection increased the average amount of eosinophilia.

C. L.

VINOGRADOFF. Les invasions vermineuses parmi la population russe et samoyède de la Toundre Timanskaya du gouvernement d'Archangel. [**Worms found in Russians and Samoyedes in Archangel.**]—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 5. pp. 329–331. [In Russian. French summary p. 332.]

In 334 Russians and Samoyedes whose faeces were examined at Toundre Timanskaya, Government of Archangel, *Diphyllobothrium latum* affected 74 per cent. of the former and 95 to 100 per cent. of the latter.

C. L.

i. BLASCHIN (A.). Die Arbeiten der zweiten Helmintologischen Expedition des Abchasischen Instituts für Tropenkrankheiten. [**Results of Helminthological Expedition of Abkhasia Institute of Tropical Diseases.**]—*Nachrichten der Tropischen Medizin.* Tiflis. 1929. Vol. 2. No. 5. pp. 352–360. [In Georgian script. German summary p. 412.]

ii. MELADSE (K.). Die Arbeit der Helmintologischen Expedition des Abchasischen Instituts für trop. Erkrankungen im Kreis Gali.—*Ibid.* pp. 361–366. [In Georgian script. German summary pp. 412–413.]

i. Examined by smears and Fülleborn's gravity floatation method, 450 persons from 3 villages in East Abkhasia showed an 86·5 per cent. worm infestation. Hookworms were carried by 50 to 73 per cent. of inhabitants, 71·2 per cent. of worms recovered being necators. The work proceeds.

ii. Of 759 persons examined (431 of them school children) by unstated means, hookworms were found in 70·2 per cent., ascaris in 36·3, trichuris in 30·1 and taenia in 4.

C. L.

SWANIDSE (D.). Ergebnisse der Untersuchung der Bevölkerung aus der Tifliser Vorstadt Ortatschala auf Darmparasiten. [**Examination of Persons from a Tiflis Suburb for Intestinal Parasites.**]—*Nachrichten der Tropischen Medizin.* Tiflis. 1929. Vol. 2. No. 5. pp. 345–351. [In Georgian script. German summary p. 411.]

In this suburb of Tiflis 715 school children and gardeners were examined for intestinal parasites by a technique unnoted in the German summary. The infection percentages found were: Trichuris 86, ascaris 38, hookworms 14, enterobius 4, trichostrongylus 0·6, *H. nana* 11 (9 cases in gardeners and 27 in kindergartens), *T. saginata* 1, and for worm infections of any kind from "86 to 100." Ankylostomiasis is almost exclusively limited to incomers from West Georgia.

C. L.

GORDADSE (G.) & KAMALOW (N.). Zu der Frage der Darmwürmerinvasion bei der Eisenbahnbevölkerung der georgieschen Teiles der transkauk. Eisenbahnen. [**Intestinal Worms in the Personnel of the Georgian Section of the Transcaucasian Railway.**]—*Nachrichten der Tropischen Medizin.* Tiflis. 1929. Feb. Vol. 2. No. 2. [In Georgian script. German summary p. 180.]

By Fülleborn's method, and by smears, 712 railway scholars were examined and evidence of worms found in 98 to 100 per cent. Threadworms, ascaris and trichuris were common; *Hymenolepis nana* infected

7 per cent. of Batum scholars. Other infections were strongyloides 1 case, trichostrongylus 2, toxascaris 1, dicrocoelium 4. Hookworm eggs were detected in 7·1 to 23·9 per cent. of cases.

C. L.

MACZKIEWIECZ (A.). Die helmintho-koprologischen Untersuchungen der Bewohner der Stadt Taschkent, durchgeführt auf der Malaria-station in Taschkent im 1926–27. [**Helminthological Examinations in Tashkent.**]—*Pensée Méd. d'Usbéquistane et de Turqumenistane.* Tashkent. 1929. Aug.–Sept. No. 11–12. pp. 69–74. [In Russian. German summary p. 126.]

By an unstated diagnostic technique 723 children in schools and children's homes were found parasitized to 23·4 per cent., and 478 in a "Wurmambulatorium" to 40 per cent. Trichuris was the most prevalent parasite (12·4 and 10·5 per cent. respectively) except for a 23 per cent. infection by *Taenia saginata* in the Ambulatorium. *Hymenolepis nana* parasitized 5 to 6 per cent., and there were found in both series *Dicrocoelium lanceatum* (1·2 and 2·9 per cent.) and *Fasciola hepatica* (2·8 and 1 per cent.).

C. L.

LÖRINCZ (Franz). Ueber die in Ungarn in Menschen vorkommenden Darmparasiten bzw. Parasiteneier. [**Intestinal Parasites found in Man in Hungary.**]—*Zent. f. Bakt.* 1. Abt. Orig. 1930. Feb. 3. Vol. 115. No. 5/6. pp. 372–377. [Royal Hungarian State Hyg. Inst., Budapest.]

Faeces of 1,567 persons, broken up in 1 per cent. formalin, were strained and the filtrate examined by covered smear, by Telemann's method and mixing with glycerine. There were found infected 657 (528 under and 129 over 15 years). Of these 136 had two or more infections. The number of times the various parasites were found was as follows: *H. nana* 33, *T. solium* 2, *T. saginata* 1, strongyloides 9, trichuris 563, hookworms 1, ascaris 133, enterobius 53. Details for age, sex, and habitat of the infected are given.

C. L.

CIPRIANI (P. F.). Ricerche di elmintologia intestinale nel Comune di Argenta. [**Intestinal Worms in Argenta (Ferrara Province).**]—*Arch. Ital. Sci. Med. Colon.* 1929. June 1. Vol. 10. No. 6. pp. 262–267. English summary p. 267.

Intestinal helminthiasis was present in 84 per cent. of about 300 cases examined. Apparently Telemann's method of concentration was used. Details are: Trichuris 244, ascaris 131, enterobius 3, strongyloides 1. Hookworm eggs were not found. Infection was commoner where houses were grouped than where they were single. Installation of sanitary latrines is advised.

C. L.

HERNANDEZ-PACHECO (Diego) & PASTOR BOTIJA (Felix). Informe sobre las helmintiasis endémicas en el delta del Ebro. [**Helminthiasis in the Ebro Delta.**]—*Medicina Países Cálidos.* Madrid. 1929. July. Vol. 2. No. 4. pp. 336–351. With 9 text figs. [5 refs.]

In this rice-growing district 325 persons were examined for ankylostomiasis (the method seems unstated) with the help of the antimalar al staff. None was found, though 47 cases of trichuris infection, 35 of ascar.s, 4 of

hymenolepis and 2 of "distoma" infection were discovered. Nor is there reason to believe that hookworm infection has existed at any time in the Ebro delta.

C. L.

LOPEZ-NEYRA (Carlos Rodriguez) & TORRES LOPEZ (Antonio J.). Gusanos parasitos intestinales del hombre en España. [**Intestinal Parasites of Man in Spain.**]—*Medicina Paises Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 411–427. [70 refs.]

This summarizes for Spanish readers the findings of parasitic worms in Spain for many years past.

C. L.

SANDGROUND (J. H.). **A Consideration of the Relation of Host-Specificity of Helminths and Other Metazoan Parasites to the Phenomena of Age Resistance and Acquired Immunity.**—*Parasitology.* 1929. Sept. Vol. 21. No. 3. pp. 227–255. [58 refs.] [Med. School, Harvard Univ., Boston.]

The author discusses the work of others on host restriction or specificity and age resistance and acquired immunity. Among many other points mentioned it may here be noted that the horse may have a short-lived infection with *Schistosoma japonicum* and is then immune. "Salmon-poisoning" in dogs (infection by *Nanophyes salminicola*, a small intestinal trematode) is very fatal. Some dogs survive and have a substantial immunity. The hosts of *T. solium*, *T. saginata* and *H. nana* resist superinfection, but not reinfection, and the host's age is a factor in this resistance. Rats fed with sublethal doses of trichinella withstand reinfection, larvae being arrested in growth and swept out of the intestine. Infections with hookworms, syngamus, and *Ascaridia lineata* are considered. The question of man and pig strains of *Ascaris lumbricoides* is discussed, and also *Ascaris vitulorum*, *Trichuris depressiusculus*, *Loa papionis*, *Strongyloides stercoralis*, and certain other metazoan parasites.

C. L.

TONKING (H. D.). **A Note on the Sub-Unguinal Debris of the African Native.**—*Kenya & East African Med. Jl.* 1929. July. Vol. 6. No. 4. pp. 109–110.

Subungual debris was examined by scrapings from all digits, placed severally in a few drops of saline, faeces by D.C.F. for eggs and by simple suspension in saline for protozoal cysts. The examined were 50 prisoners already treated with carbon tetrachloride and oil of chenopodium. The findings of eggs were these :—

	Taenia.	Ascaris.	Hook-worm.	Tri-churis.	Entero-bius.
Nails	11	0	1	0	5
Faeces by D.C.F. ...	9	12	8	14	1

One macerated larva, identified as an ankylostome, was found under a nail and *E. coli* cysts in three stools.

C. L.

BOGOJAWLENSKI (N. A.) & LEWITZKI (R. G.). Wurmträger unter den zur Wehrpflicht Einberufenen nach den Ergebnissen perianaler Abschabung. [**Worm Incidence among Recruits as shown by Perianal Scraping.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Aug. Vol. 33. No. 8. pp. 413–416.

There were examined by perianal scraping on the one hand, and by investigation of the faeces by Fülleborn's and Telemann's methods on the other, 1,000 persons. The relative percentage findings were these: Enterobius 55·6 and 0·5, taenia 52·6 and 0·2, ascaris 11·2 and 45, trichuris 5·3 and 88, hookworms, dicrocoelium, and *Fasciola hepatica* 0 and 0·1 each. In those parasitized by taeniae there was no evidence in weight or height of any detrimental action by the tapeworm.

C. L.

SCHACHMATOW (A. P.). Die Methode der Schleimentnahme aus der Ampulla recti zur Untersuchung auf Wurmeier. [**Withdrawal of Mucus from Rectal Ampulla in Examination for Worm Eggs.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 352–354. With 1 text fig. [1 ref.] [Lab. of Helminth Division, Tomsk.]

Believing that the rectal mucus is a natural extractor of helminthic eggs lying in the faeces, Schachmatow uses a solid-ended glass tube with two windows which collect mucus from the rectal wall. He records results of over 5,000 examinations in which there were discovered eggs in these percentages: Enterobius 63·8, ascaris 2·2, trichuris 1·6, strongylata 2, strongyloides (larvae) 0·2, taenia 17·8, diphyllobothrium 0·4, dipylidium 1, *Hymenolepis nana* 1, *H. diminuta* 0·2, opisthorchis 1·8. The methods of Telemann and Fülleborn have given no better results than these. [There seems to be no evidence in the literature of the real value of Telemann's method. Fülleborn found his own unsuccessful in the field.]

C. L.

KORTENHAUS (Friedrich). Verbesserter Nachweis von Wurmeiern im aufgehellten dicken Trockenkotausstrich. [**Demonstration of Worm Eggs in a Cleared Thick Smear of Faeces.**]—*Muench. Med. Woch.* 1928. June 15. Vol. 75. No. 24. p. 1029. [8 refs.] [Hyg. Inst., Univ., Cologne.]

The following is the routine advised in this paper for this frequently suggested means of using a thick preparation, on the mistaken analogy of Ross's thick film method for malarial diagnosis [see this *Bulletin*, Vol. 24, p. 978]. Rub faeces up in 10 per cent. acetic acid; spread in a thick film; dry in the air; add cedar oil and a cover. It is noted, as usual, that ascaris and trichuris eggs stand out well. No figures show its value for colourless eggs.

C. L.

RUKHADZE & BLAJIN. **On a Method for staining Flukes and Tapeworm Segments as Whole Microscopical Preparations.**—*Jl. Trop. Med. & Hyg.* 1929. Dec. 2. Vol. 32. No. 23. pp. 342–343. With 4 text figs.

Unfixed small trematodes and cestodes are stained for 30 to 60 minutes in a 30 per cent. lactic acid solution in which 0·3 per cent. of carmine has

been dissolved at the boiling point; staining is checked by the microscope. Wash then in running water till purple; dehydrate as usual in alcohol and bring into Canada balsam. For large cestodes macerate in water for 3 to 4 days (in summer not more than 24 hours); stain for 4 to 6 hours; wash; immerse for 16 to 20 hours in iron-carbolic (liq. ferri sesquichlor. 3 drops, carbolic acid 1 per cent. 2 drops, water 100 cc.); wash; straighten on a slide; dry at 30° C. to 37° C.; mount in Canada balsam, or in resin dissolved in a mixture of chloroform and absolute alcohol or carbon disulphide.

C. L.

SANKIN (S. L.). Zur Methodik der Herstellung haltbarer Dauerpräparate von Eiern parasitischer Würmer. [**Production of Permanent Preparations of Ova of Parasitic Worms.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Aug. Vol. 33. No. 8. pp. 416–417. [Trop. Inst., Moscow.]

The faeces are worked up with a Telemann solution containing only 50 per cent. of hydrochloric acid, a concentrated solution deforming eggs. Of the following 10 cc. is added :—

Formalin 40 per cent.	3
Common salt	0·85
Distilled water	100

The whole is centrifuged for a minute. The supernatant fluid is poured off, the precipitate washed with more of the formalin solution and precipitated again by the centrifuge. A drop of the sediment is placed on a clean slide, covered with a clean cover glass, and ringed with Canada balsam preferably liquefied by heat and not by xylol. Such preparations are claimed to keep well for months or years, and to show up well the eggs of nematodes, cestodes and trematodes.

C. L.

HOEPPLI (R.). Histologische Beiträge zur Biologie der Helminthen. [**Biology of Helminths.**]—*Virchows Arch. f. Path. Anat.* 1929. Feb. 27. Vol. 271. No. 2. pp. 356–365. With 4 text figs. [7 refs.] [Amoy Univ., China.]

In the small intestine of a hen infected with a Davainea, microscopic sections showed that the epithelium had been locally destroyed, the scolex being attached direct to the interstitial tissue of the mucosa whose fibres the figure shows as stretched out towards it. In the intestine of a dog the scolex of *Dipylidium caninum* had equally produced denudation and had sunk almost as far as the muscularis mucosae. *Dirofilaria immitis* in the lung of the dog showed haemorrhagic infarction and its subsequent organization into fibrous tissue.

C. L.

BUCKLEY (J. J. C.) & CLAPHAM (Phyllis A.). **The Invasion of Helminth Eggs by Chytridiacean Fungi.**—*Jl. Helminthology.* 1929. Mar. Vol. 7. No. 1. pp. 1–14. With 21 text figs. & 8 figs. on 1 plate. [7 refs.]

The chytridiacean fungi *Catenaria anguillulae*, Sorokin 1876, and *Rhizophidium carpophilum*, Zoff, were found parasitizing eggs of *Dibothriocephalus latus*, and experiments were carried out with a view to the possibility of utilizing these fungi for destroying helminth eggs in septic tanks. In this strain of *C. anguillulae* the formation of resting spores was observed, and such spores are resistant to desiccation and may remain quiescent for periods of two months or more.

Both parasites also infect eggs of *D. mansoni*, *Fasciola hepatica*, and of *Parascaris equium* under laboratory conditions; but the presence of sewage in the medium greatly inhibits development and infection. *C. anguillulae* can develop under nearly anaerobic conditions in water, but not in the presence of sewage; while *Rh. carpophilum* does not develop anaerobically under either condition. Sporangia of *C. anguillulae* are stimulated to spore formation by short desiccation, up to about 24 hours, but are killed by desiccation for more than 120 hours. A temperature of 4° C. to 8° C. for a week kills this parasite; while a temperature of 37° C. is favourable and hastens its development.

P. Tate.

SÉMENOFF (G.). Sur quelques particularités biologiques dans l'helminthiase humaine. [**Biological Data in Human Helminthiasis.**]—*Acta Univ. Asiae Mediae.* Tashkent. Ser. 9. Med. 1928. No. 9. pp. 1–5. [21 refs.] [In Russian. French summary p. 6.]

A summary of established work.

C. L.

PESSÔA (Samuel B.). Notas sobre vermifugos. I. O câo como animal de escolha para o estudo experimental dos vermifugos. [**The Dog in the Experimental Study of Vermifuges.**]—*Brasil-Medico.* 1928. Aug. 11. Vol. 42. No. 32. pp. 899–900. [3 refs.] [Hyg. Inst., S. Paulo.]

The effectiveness of certain anthelmintics has been tested on a few dogs. The more important of the figures thus collected are tabulated here, dosage being in cubic centimetres [and the corresponding dosage for a man being added for easy comparison]. Tannin was tried and had no vermifugal action.

	Dose per kilo.	Hook-worms expelled.	Hook-worms not expelled.	Dose for a man of 60 kilos.
Ascaridole	0·05	7	0	3
	0·08	22	0	4·8
	1·00	0	14	60
Carbon tetrachloride	0·05	0	14	3
	0·50	10	0	30
	0·60	3	0	36
	0·20 [*sic*]	2	0	12
	1·50	7	0	90

C. L.

PESSÔA (Samuel B.). Notas sobre vermifugos. [**On Vermifuges.**]—*Brasil-Medico.* 1929. Dec. 21. Vol. 43. No. 51. pp. 1567–1569.

The author tested the anthelmintic action of certain plants on dogs harbouring *Ancylostoma caninum.* Various species of Combretum are

found in Brazil. He used an aqueous extract of *C. quadrangularis* obtained from the Wellcome laboratories, but found that up to 1·5 cc. per kilo bodyweight it was ineffectual, It enjoys considerable reputation locally. The essential oil of *Tagetes minutus* up to 0·3 cc. per kilo, also the extract of pyrethrum and the essential oil of *Kyllinga odorata*, 0·4 cc. per kilo, had neither of them any anthelmintic effect. *Ficus anthelmintica* was useless for *A. caninum* but effective for Trichocephalus in dogs, and it is suggested that further trial should be made of this for human infestations.

H. Harold Scott.

ADVIER (M.). Note sur deux anthelminthiques malgaches. [**Two Madagascan Anthelmintics.**]—*Bull. Soc. Path. Exot.* 1929. May 8. Vol. 22. No. 5. pp. 388–390.

The kernels, raw or lightly roasted, of "voatamenaka" or "tamenaka" (no scientific name is added) are given for ascaris infection at the rate of two kernels for each year of age, with 20 for an adult, taken with castor oil, fasting in the morning. Although HECKEL advised against larger quantities than 6 or 7 kernels as likely to produce nerve symptoms, Advier states that the drug has the advantage that it may be given without fear of poisoning to children of 4 to 6 months, who even at that age may be heavily parasitized.

A handful of the leaves and stems of "taimborontisloza" (*Chenopodium ambrosioides* according to HECKEL) is bruised and the juice taken by the natives without much regard to quantity; although the name signifies "turkey's dung," to Advier it recalls absinth. It is apt to cause vertigo, headache, vomiting, and even death. The suggested dose is 15 gm. of the fresh or 5 gm. of the dried plant as an infusion. It is particularly advised, in place of thymol, when there is co-existing malaria.

C. L.

MACIEL (Heraldo). O tetrachloreto de carbono e o tratamento das helminthoses. [**Carbon Tetrachloride in the Treatment of Helminth Infestations.**]—*Sciencia Med.* 1929. July. Vol. 7. No. 7. pp. 346–352.

Carbon tetrachloride was given in the slowly melting jelly form with the proprietary name of neonecatorina in doses of 3·5 gm. to 120 cases. When given in the early morning nausea was present in 7 of 50; an hour before food in 8 of 25, with some headache, vomiting and palpitation; at the same time as food in 9 of 15, with headache or vomiting in 4 móre; when given an hour after food nausea was present in 15 of 30, while 10 more had vomiting or headache. Only 1 of 12 constipated persons had nausea. Moreover, the drug is stated to have been given to 8 persons suffering from hepatic insufficiency, of whom 2 experienced nausea and 1 nausea and giddiness. In the same dose it is claimed that it disinfested 26 of 30 cases of ankylostomiasis, though the method of diagnostic examination seems nowhere to be stated.

C. L.

ROBBINS (B. H.). **The Absorption, Distribution and Excretion of Carbon Tetrachloride in Dogs under Various Conditions.**—*Jl. Pharm. & Experim. Therap.* 1929. Oct. Vol. 37. No. 2. pp. 203–216. With 1 fig. [10 refs.] [School of Med., Vanderbilt Univ., Nashville, Tenn.]

The following conclusions are reached :—

"Carbon tetrachloride is absorbed quite readily from the intestinal tract. . . . In the dog there is little if any absorbed from the stomach. Considerable absorption from the intestine and less from the colon. The amount absorbed increases with the dose [but far from in proportion]. . . .

"The rate of absorption is increased by both alcohol and fat. The increased rate with alcohol is thought not to be the cause of the severe toxic action seen when these two substances are given together. When fat is given together with carbon tetrachloride it has been shown that the carbon tetrachloride is carried up the thoracic duct in high concentration thus reaching the general circulation without passing through the liver, and produces nervous symptoms.

"When carbon tetrachloride is absorbed from the intestinal tract it is found in high concentration in the portal blood ; the amount in arterial blood (carotid) was too small to quantitate. It is found in high concentration in the liver, with the highest concentration in the bone marrow. The concentration in the liver, pancreas, brain, etc. is about the same, being about one-fifth that found in the bone marrow.

"Approximately all of the carbon tetrachloride that is absorbed is excreted by the lungs. There is no excretion of carbon tetrachloride by the kidneys."

C. L.

LOPES (Renato Souza). A medicação vermifuga atoxica. [**A Non-toxic Vermifuge.**]—*Folha Med.* 1929. Nov. 25. Vol. 10. No. 33. pp. 407–408.

To obviate the poisonous effects which sometimes follow the use of oil of chenopodium the author proposes to give it absorbed in kaolin and combined with scammony and phenol-phthalein. He maintains that the first, by preventing absorption, removes the possibility of toxic effects, while the scammony and the phenol-phthalein act as purgatives on the small and large intestine respectively. He gives the combined preparation in gelatin capsules.

H. Harold Scott.

LABERNADIE (V.). Le stovarsol comme vermifuge. [**Stovarsol as Vermifuge.**]—*Rev. Méd. et Hyg. Trop.* 1929. Nov.–Dec. Vol. 21. No. 6. p. 188. [1 ref.] [Colonial Hosp., Pondicherry.]

Referring to an article by PORRIN and noting that in the experience of colonial medical officers it is not rare for helminths to be expelled when stovarsol is being given for dysentery, Labernadie cites a boy of 12 in hospital at Pondicherry for fever which shortly left him. The stools contained many ascaris eggs, and 2 stovarsol tablets were given daily for 2 weeks. Ascarids were passed, 1 to 3 daily, and 5 days after the end of the treatment no eggs could be detected. In Guiana he had found that 4 tablets daily relieved the itching of threadworms and that these then ceased to be found.

C. L.

RICO (J. Toscano). Efficacité anti-helminthique du géraniol. [**Geraniol as an Anthelmintic.**]—*C.R. Soc. Biol.* 1929. Oct. 18. Vol. 102. No. 26. pp. 218–220. [3 refs.]

Geraniol in doses of 0·3 cc. per kgm. body weight of dogs, castor oil, and one or two drops of croton oil was found 100 per cent. effective against *Uncinaria stenocephala*, the drug being checked by killing the dogs. Doses of 5 cc. have produced no ill-effects.

C. L.

VON QUERNER (Friedrich R.). Zur Histologie des Exkretionsgefässsystems digenetischer Trematoden. I. Teil. [**Histology of the Excretory Vascular System of Digenetic Trematodes.**]—*Ztschr. f. Parasitenk.* 1929. Mar. 26. Vol. 1. No. 4/5. pp. 489–561. With 32 text figs. [Numerous refs.] [Zool. Inst., Univ., Vienna.]

There are described the topography and histology of the excretory systems of *Fasciola hepatica*, *Fasciola gigantica*, *Dicrocoelium lanceatum*, *Sterrhurus fusiformis*, *Paryphostomum radiatum*, and *Aspidogaster conchicola*. The excretory systems are divided for classification into those in which the terminal part is histologically undifferentiated, those in which it is merely dilated into an excretory vesicle, and those in which this is associated with muscle. For the rest it is shown that *Fasciola* has a network of excretory vessels and other flukes, such as *Fasciolopsis*, a system of non-anastomizing tubes. *D. lanceatum* has 10 secretory organs in each lateral half.

C. L.

ROSS (I. Clunies) & MCKAY (A. C.). **The Development of** *Fasciola hepatica* **L. in the Final Host.**—*Australian Vet. Jl.* 1929. Mar. Vol. 5. No. 1. pp. 17–23. With 3 text figs. [6 refs.]

In order to throw more light on whether immature *Fasciola hepatica* reach the liver via the peritoneal cavity or the portal vein, cercariae were fed to guineapigs and rabbits. In a guineapig, five days after feeding with 35 cercariae, 12 burrows mostly under 5 mm. long lead down into the liver from its surface and no cercariae could be collected from the peritoneal cavity. At later dates burrows were longer and wider. In one rabbit "several of the burrows came so near to the surface that the capsule was ruptured in various places and through such ruptures blood was oozing." This conclusion implies that this route is the normal one for sheep [but the described lesions suggest that the larvae were wandering in an unnatural medium]. It is held confirmed by appearances found in apparently early natural infections in sheep.

C. L.

KELLAWAY (Charles H.). **Anaphylactic Experiments with Extracts of Liver Fluke** (*Fasciola hepatica*).—*Australian Jl. Experim. Biol. & Med Sci.* 1928. Dec. 16. Vol. 5. Pt. 4. pp. 273–283. With 2 text figs. [13 refs.] [Walter & Eliza Hall Inst., Melbourne.]

In this important study Kellaway employed the method of Dale & Laidlaw on the isolated uterus of the virgin guineapig with the object of throwing fresh light on the nature of the substances in helminthic extracts which act as anaphylactic antigens. Guineapigs were sen-

sitized by injections given a few days after birth and both saline and alcoholic extracts of flukes of different strengths were employed. The flukes were well washed, completely dried and powdered before extraction. In all the experiments care was taken to free extracts from pharmacological activity by dialysis or pressure filtration, and to use them only in a dosage which had no stimulant effect on the normal uterus. Sensitiveness to ovine host protein was also tested.

In the first group of experiments saline extracts were used for both sensitization and testing, and TURNER's findings that guineapigs could be sensitized with these extracts were confirmed. The results, however, were not highly specific, for guineapigs sensitized with *Taenia saginata* and hydatid scolices showed cross reaction to fluke extracts. When saline extracts were used to sensitize no response followed with the absolute alcoholic extract (99·9 per cent. ±0·1 per cent.), but a maximal contraction ensued when the 60 per cent. extract was added to the bath. Extracts of intermediary strength (80 per cent.) gave irregular results. On the other hand, the injection of even the absolute alcoholic extract generally led to sensitization provided the uterus was tested with saline extract, a result of considerable interest, since the most delicate chemical tests for protein were negative in the former.

Kellaway concludes that two substances are concerned in these anaphylactic reactions. The first one is present in the saline extract and shows a decreasing solubility in increasing strengths of alcohol. It is a true anaphylactic antigen, but differs in nature from other proteins in its resistance to heat. The second, soluble in absolute alcohol, is capable of sensitizing guineapigs but not of discharging the sensitiveness of sensitive plain muscle. The latter substance is thought to be a lipin possibly identical with the antigen responsible for complement fixation.

A valuable discussion on the technique, the limitations and the difficulties of the anaphylactic method is included in this paper, which should be consulted in the original by those interested in the subject.

N. Hamilton Fairley.

HOFFMAN (William A.) & RIVERA (Trinita). **The Precipitin Test in *Fasciola hepatica* Infection.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1929. June. Vol. 4. No. 12. pp. 589–598. [School of Trop. Med., Univ. of Porto Rico, San Juan.]

Hoffman & Rivera describe the results of an investigation into the value of the precipitin test in infestations with *F. hepatica*. Flukes which had been previously washed were dried and powdered and from this material four antigens were prepared from the non-soluble residues of Soxhlet extractions with ether, alcohol, ether-alcohol, and alcohol-ether. Coca's solution and physiological saline were both used as solvents, 5 mgm. to 2 cc. of liquid being the final quantities selected for the production of the undiluted antigen.

At the abattoirs the faeces and livers of all animals investigated were examined for ova and flukes respectively after specimens of heart blood had been obtained. In the final technique the authors employed 5 tubes to each test, 0·15 cc. being the quantity of serum utilized. Equal quantities of a 1 : 1, 1 : 10 and 1 : 100 dilution of antigen were added to the first 3 tubes. The remaining two served as antigen controls. Results were designated ++++, +++, and ++ according to

the intensity and thickness of the ring formed between the serum and antigen in the positive test. Readings were made after one and two hours at room temperature.

Post-mortem evidence of *F. hepatica* was found in 46 of 101 animals examined, and their sera all yielded positive reactions. In 39 other instances, however, positive serological results were observed where no parasitological evidence of fluke infestation was forthcoming. Possible explanations of this disparity are discussed. With 38·6 per cent. of unexplained positive results the non-specific nature of the reaction needs critical consideration.]

N. Hamilton Fairley.

ISHII (S.). **Human and Dog Cases of *Fasciolopsis buski* in Canton, China.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. Mar. No. 288. [In Japanese. English summary p. 13.] [Haku-Ai-Kai Hosp., Amoy, China.]

"Examining the feces of 462 Chinese patients in the Haku-Ai-Kai Hospital at Canton, the author found eggs of *Fasciolopsis buski* in 7 patients (1·5 per cent.), and by the examination of 6 dogs he found the same eggs in 4 of them. From these figures he concludes that *F. buski* is not uncommon among the natives of Canton and that in this locality the dogs may be the definite hosts of this parasite."

C. L.

ANAZAWA (K.). **First Instance of *Echinostomum revolutum* found in Man and its Course of Infection.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. Mar. No. 288. [In Japanese. English summary pp. 10–13.] With 8 figs. on 1 plate & 1 text fig.

Echinostomid ova were found in the faeces of a woman, a native of and resident in Formosa. Male fern recovered from her 18 *Echinostoma revolutum* Froelich, 1802, a parasite of the duck. The worm is described and pictured. The local snail hosts have been determined by TSUCHIMOCHI and *Limnaea radix*, *L. pervia*, *Segmentina largillierti* and *Planorbis coenurus*, while Anazawa, noting that Formosans eat *Corbicula producta* raw and that they contained cysts which he identified as those of *E. revolutum*, and *Echinoparyphium koidzumii*, fed them to chickens, ducklings, mice and puppies previously examined as to the absence from their faeces of echinostomid ova, and produced both infections. The cysts possess considerable resistance to chemicals, to drying and to heat. *E. revolutum* having been found in man, a trematode in YOKOGAWA's possession, obtained from a patient by K. AKAGI in 1916, was re-examined by MORISHITA of the Central Research Institute of Formosa and identified as *Echinoparyphium koidzumii*. The paper, then, adds two to the list of occasional parasites of man.

C. L.

MAEDA (M.). Ueber die in den menschlichen Fäces enthaltenen unbekannten Parasiteneier und ihr Wesen. [**Unknown Parasite Ova found in Human Faeces: their Nature.**]—*Fukuoka-Ikwadaigaku-Zasshi* (*Fukuoka Acta Med.*) 1928. Aug. Vol. 21. No. 8. pp. 1690–1698. With 2 plates. [In Japanese. German summary pp. 82–83.]

Maeda had established that in spring and summer there were found in the faeces of certain persons curious trematode eggs. He noted that

those persons were fond of eating flying fish. In the gall bladder of this fish he found eggs similar to those found in man and also the fluke from which they came. The eggs are oval, yellowish brown, operculated as the figure shows, about 0·036 mm. long by 0·026 broad, and contain a miracidium with a collar of cilia. The adult trematode measured 9·5 by 4 mm. Neither abstract nor figure is very clear as to its internal anatomy. [The eggs, then, did not imply parasitism, but an undigested residue of food.]

C. L.

FELDMAN (William H.) & ESSEX (Hiram E.). Distomatose pulmonaire chez le chat. [**Pulmonary Distome Infection in a Cat.**]—*Ann. Parasit. Humaine et Comparée.* 1929. May 1. Vol. 7. No. 3. pp. 204–208. With 7 figs. on 2 plates. [5 refs.]

What is claimed as the second reported case of pulmonary trematode infection in a cat in Minnesota is reported. The animal had been ill for about a year with cough, sometimes with greenish expectoration. In section of the lungs after death no flukes were found, but there were numerous eggs corresponding to Paragonimus. Their specific position is discussed.

C. L.

FAIRLEY (Keith D.) & FAIRLEY (N. Hamilton). **Bilharzia in Immigrants from Palestine.**—*Med. Jl. Australia.* 1929. Oct. 26. 16th Year. Vol. 2. No. 17. pp. 597–600. [21 refs.] [Walter & Eliza Hall Inst. of Research in Path. & Med., Melbourne.]

NELSON (1912) (this *Bulletin*, Vol. 1, p. 426) reported three cases of schistosomiasis in Western Australia, in two of which the infection was indigenous, so that some species of local mollusc must be capable of infection, though CHERRY has failed to infect some 300 local snails of the genera *Bullinus*, *Ancylus* and *Planorbis*. Four cases of vesical schistosomiasis are described from Australia in which infection was contracted about Jaffa in Palestine. In two there were eggs of *S. mansoni* as well as of *S. haematobium*. Only one had shown symptoms before reaching Australia. All were positive to the complement fixation reaction, the value of which as a means of early diagnosis during the long latent period is pointed out.

C. L.

RUBITSCHUNG (O.). Von der Bilharziosis in Palästina und der Behandlung mit Antimosan (661 Heyden). [**Schistosomiasis in Palestine and its Treatment by Antimosan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 32–37. With 2 text figs.

Some cases of infection with *Schistosoma haematobium* are reported as acquired round Jaffa. While the conclusions state that *Melanopsis praemorsa* is established as intermediate host, the text appears only to say—in a footnote—that of snails sent to Hamburg for report and

falling into nine species, only *Unio* (*Limnium*) *tigridis* and *M. praemorsa* live in fresh water and that the former can probably be excluded. Antimosan is advised for treatment of children in preference to tartar emetic. At 2 to 3 days' intervals 2 to 8 cc. were given to boys of a 5 per cent. solution, with a total dose of 3 to 3·5 gm. of antimosan.

C. L.

CARROSSE & BARNÉOUD. Enquête sur la bilharziose vésicale à Marrakech (*Schistosoma haematobium*). [**Vesical Schistosomiasis at Marrakesh, Morocco.**]—*Arch. Inst. Pasteur d'Algérie.* 1929. Mar. Vol. 7. No. 1. pp. 51–78. With 8 plates & 2 text figs. [68 refs.] [Milit. Hosp., & Bureau of Hygiene, Marrakesh.]

The wide distribution of the intermediate hosts of *S. haematobium*, and the expense which would be involved in a local attack upon them, are shown. Periodical drying is not locally possible; the raising of ducks is encouraged. Copper sulphate has given constant results against snails in a dilution of 1 in 300,000. Propaganda is needed to combat the fatalistic creed of the natives.

C. L.

i. MACIEL (Heraldo). Sobre a frequencia da pseudodysenteria eschistosomotica na marinhagem brasileira. [**Bilharzial Dysentery among Brazilian Sailors.**]—*Sciencia Med.* 1929. Oct. Vol. 7. No. 10. pp. 512–513.

ii. ——. Contribuição ao estudo da distribuição geographica da eschistosomose intestinal, no Brasil. [**The Geographical Distribution of** *Schistosoma mansoni* **in Brazil.**]—*Ibid.* pp. 514–516.

i. Patients treated for schistosomiasis in the Hospital Central de Marinha in the six years ending September 1929 number 1,130. Of these there have been 386 (34·1 per cent.) with symptoms of dysentery, 40 of a severe type, and 346 (30·6 per cent.) with mild diarrhoeic attacks, the faeces being streaked with blood.

ii. A second paper on the same subject stating that the infection is spreading with considerable rapidity and that fresh foci are being discovered; Nictheroy is a district recently found contaminated. *Planorbis olivaceus* and *Pl. guadeloupensis* are abundant on the north-east, *Pl. centrimetralis* in the central districts also.

H. Harold Scott.

ZAVATTARI (Edoardo). Malacofauna e schistosomiasi nel bacino del Mediterraneo. [**Molluscs and Schistosomiasis in the Mediterranean Basin.**]—*Arch. Ital. Sci. Med. Colon.* 1929. Mar. 1. Vol. 10. No. 3. pp. 121–128. With 2 figs. [13 refs.] English summary p. 129. [Inst. of Comp. Anat. & Physiol., Univ., Pavia.]

Melania tuberculata is fairly abundant in Northern Africa, South of Morocco, Algeria, Tunis and in Egypt. Recently it has been found in Tripolitania and Cyrenaica. The closely allied *M. nodicincta* has been

shown by DYE to act as the intermediate host of *Schistosoma haematobium* and it is well within the bounds of possibility that the former may also be able to act as an intermediate host, and so introduce schistosomiasis into North Africa, Southern Italy and the neighbouring islands, which at present are free.

Various species of *Bullinus* also are found: *B. tropicus* in South Africa, *B. innesi* in Egypt and the Nile Basin, *B. dybowskyi* in Tunisia and Egypt, and *B. contortus*. The three last named are typical molluscs of the Mediterranean.

Planorbis metidjensis occurs in Algeria and Morocco, and *Pl. pfeifferi* and *Pl. boissyi* and *Pl. mareoticus* are present in parts of Africa.

The danger to Italy of all these intermediate hosts is obvious when infection is not far distant.

H. Harold Scott.

MEDULLA (Candido). Due casi di bilharziosi in Cirenaica. (Contributo alla casistica, alla nosogeografia ed alla terapia.) [**Two Cases of Schistosomiasis in Cyrenaica.**]—13 pp. [19 refs.] 1928. Benghazi. [Cyrenaica: Ospedale Coloniale di Bengasi.]

One of the patients was a native of Fezzan (Tripolitania), the other of Cyrenaica. They suffered from haematuria, and ova of *S. haematobium* were present in the urine. Treatment by bismucol being ineffectual, antimony was injected intravenously. The second ceased to pass ova after a treatment of 518 mgm. of "stibional," but in the first they persisted in spite of 69 cgm. of a 1 per cent. solution antimony tartrate.

H. Harold Scott.

MENNONNA (Gerardo). La bilharziosi nell'alto Benadir. [**Schistosomiasis in Northern Benadir.**]—*Arch. Ital. Sci. Med. Colon.* 1929. Nov. 1. Vol. 10. No. 11. pp. 544–550. With 2 text figs. English summary p. 550.

A sketchy description of schistosomiasis in general and of *S. haematobium* in particular, stating that it exists in the northern Benadir district of Italian Somaliland. The author has not found the specific intermediate host among the molluscs he has examined.

H. Harold Scott.

PELTIER (M.). Contribution à l'étude de la prophylaxie antibilharzienne dans ses relations avec l'utilisation militaire des indigènes et l'essor économique de leurs colonies d'origine. [**Schistosome Prophylaxis in Relation to the Military Employment of Natives.**]—*Rev. Prat. Malad. des Pays Chauds.* 1929. June. Year 8. Vol. 9. No. 6. pp. 253–260, 263–265.

The paper is largely concerned with the possibility that schistosomiasis may become established in France, as the result of its introduction by infected African soldiers. No autochthonous case is known, though infected persons have entered France for more than 100 years, for many of Napoleon's soldiers came back from Egypt with haematuria. *Bullinus* sp. are present in Corsica, and BRUMPT has said that urinary bilharziasis could very readily be implanted about Porto-Vecchio in the south of that island.

C. L.

SCHEEPERS (Ivan K. M.). **Stopping the Spread of Bilharzia.**—*World's Health.* 1929. July–Sept. Vol. 10. No. 3. pp. 262–266. With 1 fig.

The enthusiasm of Mr. Duncan LINNEY, Inspector of Schools for the Rustenburg district, Transvaal, resulted in the setting up of a Christmas camp for the treatment by intravenous tartar emetic of children suffering from bilharziasis. Forty-nine were treated and 48 left with clear urine. The enthusiasm and devotion of those who voluntarily ran the camp and treatment clinic has aroused an increasing local interest, and the experiment is unlikely to end with this camp.

C. L.

PRICE (Emmett W.). **A Synopsis of the Trematode Family Schistosomidae with Descriptions of New Genera and Species.**—*Proc. U.S. Nat. Museum.* 1929. Vol. 75. Art. 18. 39 pp. With 15 plates. [5 pages of refs.]

Price divides the family into two subfamilies, Schistosominae with the male expanded into a gynaecophoric canal, and a new one, Bilharziellinae, in which the two sexes have similar forms. Within the former three new American species have been made types of three new genera, *Heterobilharzia, Microbilharzia* and *Paraschistosomatium.*

C. L.

MANSON-BAHR (Philip). **On Fairley's Intradermal Reaction in Schistosomiasis.**—*Jl. Helminthology.* 1929. June. Vol. 7. No. 2. pp. 99–100. With 1 plate. [1 ref.]

Two cases of infection with *S. haematobium* received respectively 22 grains and 21 grains of sodium antimony tartrate, given intravenously. Ova ceased to appear in each case after injection of 19 grains. Five days after the end of treatment an antigen prepared by FAIRLEY was injected intradermally. It consisted of dried powdered livers of *Planorbis exustus* infected with *S. spindalis* of the goat. Both cases showed a most marked reaction, beginning within 10 minutes of injection. "Fairley considers the test to be exclusively of diagnostic value and as not affording any index of the effect of drug treatment."

C. L.

BETTENCOURT (A.) & DA SILVA (E. Pereira). **The Cercaria of *Schistosoma haematobium*: with Reference to an Article of Blacklock and Thompson on Human Schistosomiasis in Sierra Leone.**—*Arquivos Inst. Bact. Camara Pestana.* 1928. Vol. 6. No. 1. pp. 1–21. With 11 text figs. & 1 plate. [23 refs.] [Camara Pestana Inst., Lisbon.]

This paper criticizes one by BLACKLOCK and THOMPSON (this *Bulletin*, Vol. 21, p. 940) on the anatomy of the cercaria of *S. haematobium.* The essential matters in disagreement are these. Bettencourt's cercariae are shorter than those described by BLACKLOCK and THOMPSON, a point on which stress is not laid since the methods employed for killing were different; the English authors saw no ciliated areas in the collecting tubes. But the main points of difference lie in the cephalic glands. Bettencourt and da Silva (*loc. cit.*, Vol. 20, p. 218) saw only

three pairs of glands, all of the same type, a point on which they were upheld by FAUST (Vol. 17, pp. 55, 58) and MANSON-BAHR and FAIRLEY (Vol. 16, p. 131). BLACKLOCK and THOMPSON, however, describe five pairs, three fine-grained and two coarse-grained. The accuracy of the observations by the two sets of observers is unquestioned. Which set was describing *S. haematobium?* Bettencourt is "absolutely convinced" that he was, since his snails came from a single pond from which animals were excluded, but which was "infested" by washerwomen, 70 per cent. of whom harboured *S. haematobium* and who had the unpleasant habit of passing urine in the pond in which they did their washing. All the hundreds of cercariae obtained from *Planorbis metidjensis* living in this pond were of the same type and produced in mice typical adult *S. haematobium.*

C. L.

PLAUT (Alfred) & VOGEL (H.). **The Differentiation of** *Schistosoma hematobium* **and** *Schistosoma mansoni* **according to the Position of the Spine.**—*Arch. Pathology.* 1928. Nov. Vol. 6. No. 5. p. 871. [1 ref.]

Plaut (1927) reported that he had found schistosome eggs with polar spine in the appendix of a woman in whose urine lateral spined ova were present, and concluded that "the position of the spine, whether polar or lateral, does not allow the differentiation of the two kinds of *Schistosoma.*" FÜLLEBORN in a letter to Plaut claimed that, in sections, lateral spines might appear as if they were polar in position. Accordingly paraffin blocks containing bits of appendix and uterus were forwarded to Hamburg. After removal of paraffin and isolation of the eggs by solution of the tissues, all the 151 ova isolated from the appendix showed a lateral spine. "To determine whether spines in eggs of *Bilharzia* are polar or ventral, observations must be made on isolated eggs and not on sections of tissue."

C. L.

i. KHOURI (J.). Deux cas de bilharziose vésicale avec présence simultanée dans les urines d'oeufs à éperon polaire et à éperon latéral. [**Vesical Schistosomiasis with both Terminal and Lateral-spined Ova in the Urine.**]—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. p. 771. [2 refs.]

ii. ——. Sur un cas rare d'infestation intestinale simultanée par *Schistosomum mansoni* et par *Sch. haematobium.* [**Case of Intestinal Infestation with** *S. mansoni* **and** *S. haematobium.*]—*Ibid.* p. 772. [1 ref.]

iii. LEGER (Marcel). A propos de la localisation aberrante de *Schistosomum haematobium* et de *Schistosomum mansoni.*—*Ibid.* pp. 773–774. [2 refs.]

Leger comments on i and ii, whose titles explain their contents, and cites the literature and 19 personal observations on men showing schistosome eggs in their stools. Six of them harboured *S. haematobium.* He notes that the eggs of *S. mansoni* are more rarely found in the urine than those of *S. haematobium* in the faeces.

C. L.

RAYNAL (Jean). Sur les localisations aberrantes des schistosomes chez l'homme. [**Aberrant Localizations for Schistosomes in Man.**]—*Rev. Méd. et Hyg. Trop.* 1929. July–Aug. Vol. 21. No. 4. pp. 115–122. [29 refs.]

The following are anomalous findings taken from the literature. i. Eggs of *S. haematobium* appeared in the stools, (*a*) alone, (*b*) in conjunction with those of *S. mansoni*, (*c*) in the urine as well. ii. Eggs of *S. mansoni* were found in the urine. iii. Eggs of *S. mansoni* were found in the urine and of *S. haematobium* in the stools.

C. L.

CHRISTENSON (Reed O.) & GREENE (W. P.). **Studies on Biological and Medical Aspects of "Swimmer's" Itch. Schistosome Dermatitis in Minnesota.**—*Minnesota Med.* St. Paul. 1928. Sept. Vol. 11. No. 9. pp. 573–575. With 3 text figs. [3 refs.]

CORT noted in Michigan (this *Bulletin*, Vol. 25, p. 946) that the entry of *Cercaria elvae* usually produced a skin eruption. For a number of years there has been reported from several lake regions in Minnesota a peculiar type of follicular dermatitis locally known as swimmer's itch. Investigation showed three types of furcocercous cercariae emerging from local snails, one being *C. elvae* and its host being *Lymnaea stagnalis opressa*. Application to the skin of water containing these cercariae produced the typical follicular dermatitis; liberal application of the same water free from cercariae produced none. The lesions surround hair follicles.

C. L.

TSYKALAS & RIEGL (R.). L'émétine et la papavérine contre les affections bilharziques. [**Emetine and Papaverine in the Treatment of Schistosomiasis.**]—*Rev. Méd. et Hyg. Trop.* 1929. Sept.–Oct. Vol. 21. No. 5. pp. 137–157. [32 refs.]

The effects of papaverine are under investigation. Emetine is given in daily doses of not more than 0·1 gram, the total not exceeding 1 gram. With this treatment, as the authors note, FAIRLEY recorded 100 per cent. of cures; their own were 90·5 per cent. With tartar emetic the corresponding figures are 85 and 60. With 60 per cent. of cures with tartar emetic they had 4 per cent. of deaths, and when this drug was combined with emetine 80 per cent. of cures and a 6·15 per cent. mortality. The number of cases treated does not appear to be stated.

C. L.

PELTIER (M.) & RAYNAL (J.). Le chlorhydrate d'émétine en injections sous-cutanées dans le traitement des bilharzioses vésicales et intestinales. [**Emetine Hydrochloride subcutaneously in the Treatment of Vesical and Intestinal Schistosomiasis.**]—*Bull. Soc. Path. Exot.* 1929. Mar. 13. Vol. 22. No. 3. pp. 168–173. [2 refs.]

Some "incidents" having followed intravenous administration of emetine, the authors have given it subcutaneously to about 50 persons having vesical infections with *S. haematobium*. The general dose,

tentatively begun, is 0·1 gram daily for about 10 days. In 28 of them the period after treatment sufficed for fair comment. Nineteen left hospital cured. Relapses occurred in 6. In rectal infection with *S. mansoni* the detection of eggs is difficult and results less certain, but of 26 cases 23 passed from observation negative to ova, and 3 were lost to sight. It is therefore held with BOUILLIEZ that *S. mansoni* is more susceptible to emetine than *S. haematobium.*

C. L.

KHALIL (M.) & BETACHE (M. H.). **Treatment of Bilharziasis with a New Compound "Fouadin." Report on 2041 Cases.**—*Lancet.* 1930. Feb. 1. pp. 234–235. With 1 text fig. [2 refs.]

The authors report on 2,041 cases of schistosomiasis treated by intramuscular injection with fouadin, a trivalent organic antimony compound containing 0·0055 gm. of antimony in 1 cc. There was one death from sudden collapse on the day following the termination of treatment, which consists of 9 injections rising from 1·5 cc. to 5 cc. at the third injection and continuing at that level till the ninth or the fifteenth day. If these have not produced "cure," more are given. Cure after nine injections occurred in 44·3 per cent., after ten in an added 13·4, after eleven in an added 2·1 per cent., and after more than eleven in 0·5. Uncured were 44 or 2·1 per cent., while 669 or 32·8 per cent. did not complete treatment and 241 or 10·5 per cent. refused it. No inflammatory changes were noted after injection; the treatment was shortened compared to that with tartar emetic. It did not need skilled administration. On a large scale a syringe with a two-way and a reservoir allow for mass work, the needles being boiled between injections.

C. L.

WALKER (J.). L'application du tartre émétique par voies différentes dans la thérapeutique de la bilharziose. [**Treatment of Schistosomiasis by Tartar Emetic variously given.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. Dec. Vol. 8. No. 3. pp. 273–289.

One hundred and forty-four cases were treated, with eight deaths; the main details appear in the table.

	Cases.	Cured.	Uncured.	Treatment stopped.	Died.
Intravenous injection ...	36	27	3	3	3
Tablets orally in intestinal infection	80	67	6	6	1
Tablets orally in urinary infection	7	4	3	—	—
Rectal injections ...	15	8	2	—	2

Intravenous injection was with doses of 0·04 gm. to 0·1 gm., with an average total of 1·2 gm. Oral tablets contained 0·015 gm. of tartar

emetic with albumen from yeast, 6 to 8 being ordinarily given daily, with an average dose of 1·8 gm. ; in ten cases emetine had to be added but two died. Rectal injections each contained 0·5 gm. of tartar emetic in 10 per cent. solution, repeated 10 to 15 times. It would seem then that oral administration gave the most cures and the fewest deaths, though the author's conclusions are that intravenous injection gives the most constant results. Oral treatment provokes vomiting, but is specially advised for the weak. Intestinal injections are held to give a very rapid local result. After a full treatment, there is held to be little tendency to recurrence, even although the habitat is unchanged. Eosinophilia often appeared only during treatment, but was present to 20 per cent. in 6 of 9 patients who harboured *Filaria perstans*.

C. L.

CAWSTON (F. G.). **A Consideration of the Doses and the Solution used in the Treatment of Schistosomiasis.**—*Jl. Trop. Med. & Hyg.* 1930. Jan. 1. Vol. 33. No. 1. pp. 7–8.

Dosage of antimony corresponding to age and severity of infection is preferred to that corresponding to the patient's weight, experience teaching that those with a heavy infection tolerate unusually heavy dosage. Alcohol induces intolerance. Indian children, in spite of their small size, tolerate dosage corresponding to their age. Glucose is held not materially to lessen the toxic effects of tartar emetic, which are very slight when a pure drug is used.

C. L.

SMYRNIOTIS (P. C.). Calcification bilharzique des vésicules séminales décélée radiologiquement chez un sujet qui est infecté par la bilharzia mixte (termino et latéro-spinale). Avec présentation des radiographies et de la préparation microscopique. [**Calcification of Seminal Vesicles in a Patient with Mixed Schistosomiasis.**]—*Jl. Egyptian Med. Assoc.* 1929. Dec. Vol. 12. No. 10. pp. 231–235. With 3 plates (2 folding).

X-rays showed in this case an irregular bladder with " pseudodiverticula " about the base, and with calcification of the vesiculae seminales and of the apex of the bladder. Scraps of tissue passed in the urine were identified as probably sarcomatous.

C. L.

CERQUA (Saverio). Prostata-Zyste durch Bilharzia verursacht. [**Cysts in Prostate caused by Schistosoma.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Jan. Vol. 34. No. 1. pp. 58–61. With 3 text figs. [6 refs.] [Umberto I Italian Hosp., Cairo.]

A case is recorded where infection with *Schistosoma haematobium* was apparently limited to the prostate. A man of 40 complained of frequency of micturition, scalding and erection. The bladder sound showed nothing, rectal examination a painless elastic swelling in the left prostatic lobe. Prostatic massage produced no secretion. Excision of part of the cyst wall (enucleation having failed) showed eggs of *S. haematobium* between its fibrous layers.

C. L.

GIRGES (Rameses). **Schistosomiasis Mansoni.**—*Lancet.* 1929. Apr. 20. pp. 816–819.

——. **The Clinical Aspect of Schistosomiasis.**—*Jl. Trop. Med. & Hyg.* 1929. Oct. 1. Vol. 32. No. 19. pp. 269–284. With 12 charts & 18 figs. in text.

Observation of over 4,000 cases of infection with *Schistosoma mansoni* at Tanta on the Nile delta, the centre of the largest endemic area of bilharziasis in the world, has led Girges to divide the disease into two types, intestinal and hepatic.

The intestinal type is considered under four stages following an incubation period. The first, febrile or toxaemic, seen in 3 per cent. of patients, begins three to five weeks after the "Baoonah itch" which marks cercarial invasion as an acute or insidious febrile attack, with invariable enlargement of liver and spleen, and occasional appearance of wheals and nephritis, and more frequently indigestion, diarrhoea and tenderness over the gall bladder. There is chlorotic anaemia, leucocytosis, and a 30 to 70 per cent. eosinophilia. It lasts three to six weeks. The second, dysenteric, begins with the appearance of ova in the stools, was seen in 58 per cent. of the series, lasts two and a half to three years, and shows dysenteric exacerbations every 15 to 20 days, with much fever. The mucous membrane as seen by the sigmoidoscope is deeply congested and velvety, with a dense covering of mucus, but no papillae. When these appear the third stage has been reached which comprised 32·5 per cent. of cases seen; the lower bowel is thickened and palpable through the abdominal wall, and the eosinophilia becomes slight. In the fourth stage, of repair, seen in 0·2 per cent. of cases, there is sclerotic fibrosis, incurable, with mild symptoms, and not responding to treatment with intravenous tartar emetic, as do the other three.

The hepatic type—Egyptian splenomegaly is given as a synonym—is characterized typically by absence of ova from the stools, but in all cases examined post-mortem [the number is unstated] male worms alone were present. The incubation and first stages are as in the intestinal form. The second stage is marked by enlarged, hard, and often tender liver and spleen generally reaching at least half way to the umbilicus. A chlorotic anaemia is accompanied by leucopenia (average 4,500) and relative lymphocytosis. The third or ascitic stage, seen in 2 per cent. of the series, shows hardening and contraction of the liver with ascites and increasing weakness and wasting. In the first and in the beginning of the second stage intravenous tartar emetic cures; in the latter part of the second it may ameliorate the condition; in the third it is unavailing and the patient dies within a year of the onset of ascites.

C. L.

GIRGES (Rameses). **Pathology of Schistosomiasis Mansoni.**—*Jl. Trop. Med. & Hyg.* 1930. Jan. 1. Vol. 33. No. 1. pp. 1–7. With 6 text figs.

GUIRGIS (Ramsis). **Pathology of the** *Bilharzia Mansoni.*—*Jl. Egyptian Med. Assoc.* 1929. Dec. Vol. 12. No. 10. pp. 204–217.

These papers are identical except for a few words and for the presence of figures in one. The histology of papillomata, ulcers, tumours and tubercules is detailed, as well as of the hepatic lesions.

C. L.

MANSON-BAHR (Philip). **On a Case of Schistosomiasis mansoni associated with Splenomegaly and Anaemia in a European. (The First Recorded Instance from Tanganyika Territory.)**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. pp. 507–508.

This is believed to be the first case of schistosomiasis reported from Tanganyika Territory. The man died in England of interstitial nephritis. Eggs of *S. mansoni* had been present in the faeces ; liver and spleen were enlarged and hard. The number of eggs in each faecal preparation varied greatly from day to day, but they disappeared after injection of 17½ grains of antimony tartrate.

C. L.

RAYNAL (J.). *Schistosoma mansoni* chez le Malgache. [*S. mansoni* **in Madagascar.**]—*Ann. Parasit. Humaine et Comparée.* 1929. Jan. 1. Vol. 7. No. 1. pp. 10–28. With 2 maps in text. [10 refs.]

Infection is heaviest in the southern plateau of the island, 55·3 per cent. of 170 examinations. Four preparations of undiluted faeces under a cover examined on a mechanical stage were used for diagnosis. In the north no infection was found.

C. L.

PERRY (H. Marrian). **The Occurrence of Schistosome Ova in the Spleen in Egyptian Splenomegaly.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. p. 543.

Marrian Perry points out that the statement that eggs of *S. mansoni* are present in the liver and other viscera but not in the spleen is incorrect. He has found the ova in the spleen in man and BRUMPT has presented him with sections of the spleen of an experimentally infected mouse with numerous ova in them.

C. L.

HARPER (J.). **Japanese Schistosomiasis. Report of a Case in which the Diagnosis was made following an Appendectomy.**—*U.S. Nav. Med. Bull.* 1929. July–Oct. Vol. 27. Nos. 3–4. pp. 661–668. With 1 plate. [18 refs.]

A dull pain developed in the right lower abdomen six years after the patient's only foreign service—in China. Two years later, the discomfort persisting, a normal-looking appendix was removed which on section contained abundant eggs of *S. japonicum*, the first discovered evidence of infection. While under observation after operation "an egg of *S. japonicum* was found in each of 4 separate stools after concentration." They contained miracidia, but these were not found to hatch. Complement fixation, intradermal and blood serum aldehyde tests were negative. After the operation some discomfort in the right lower abdomen persisted after food.

C. L.

KAWAMURA (R.). **The Recent Researches on Schistosomiasis Japonica in Japan.**—*Japan Med. World.* 1929. May 15. Vol. 9. No. 5. pp. 165–170.

In a section headed Serological Reaction and Immunity, Kawamura refers to certain serological studies and immunity experiments undertaken in his department. Contrary to general experience, he reports that saline extracts of parasites prepared by MIYAJI and IMAI constituted superior antigens to alcoholic extracts manufactured from either adult schistosomes or cercarial infected livers. MIYAJI and IMAI using a similar saline extract also developed a precipitin reaction. By means of both these tests reliable serological diagnoses were readily made in *S. japonicum* infection.

In the first group of immunity experiments infected animals after treatment with intravenous injections of antimony were re-exposed to cercariae. No eggs or only a few eggs were demonstrable in the faeces, and at autopsy limited numbers of schistosomes were found in the portal veins. The development of worms was regarded as being retarded in comparison with untreated animals, and the question arose as to whether the immunity so produced originated from living or dead worms. Another series of animals therefore received two to four injections of a schistosome saline extract before being exposed to cercariae. The number of parasites recovered at autopsy never exceeded 100 and the slight changes noted in the inoculated animals as compared with the non-injected controls were regarded as indicating some grade of acquired immunity. A similar degree of protection was obtained in animals injected with sera derived from heavily infested definitive hosts, and Kawamura concluded that active immunity developed against *S. japonicum* not only in the tissue of animals but also in the human body.

[Actually the numbers of cercariae applied in these experiments were never numerically estimated, infection being produced by merely "smearing the shaved abdominal skin with the snails' livers containing active cercariae." Such a technique cannot ensure the exposure of control and experimental animals to an equivalent dosage of cercariae, and for this, if for no other reason, the validity of these experimental results is questionable.]

N. Hamilton Fairley.

BRUMPT (E.). Cycle évolutif complet de *Schistosoma bovis*. Infection naturelle en Corse et infection expérimentale de *Bullinus contortus*. [**Developmental Cycle of** *S. bovis* **in Corsica.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Jan. 1. Vol. 8. No. 1. pp. 17–50. With 17 text figs. & 8 figs. on 2 plates. [50 refs.] [Anti-malaria Station, Porto-Vecchio, & Parasit. Lab., Faculty of Med., Paris.]

A furco-cercaria, not *Cercaria octadena*, found in *Bullinus contortus* has grown into typical *Schistosoma bovis* in mouse, hedgehog and guinea-pig. Its distribution in the island of Corsica is very restricted. The paper contains, however, much of interest regarding human schistosomiasis. An attempt was made to determine the fecundity of *S. bovis* and *S. mansoni*. It was first noted that mice infected with *S. mansoni* presented eggs on the 36th day; and that one infected 63 days earlier with *S. bovis* showed eggs, while none killed at a still earlier date did so.

These intervals after infection were tentatively accepted as of general application. The procedure was to infect a mouse and kill it on a definite day, crush the liver and count the eggs in a known fraction of it, and section a known fraction of the small intestine and count the eggs found. The number of female schistosomes discovered in the veins was noted, and the number of days since the estimated date of maturity. It was thought that females missed from the veins on the one hand, and eggs laid in other organs on the other, might more or less cancel one another. In this way it was calculated that a female *S. mansoni* layed 157 and 191 eggs daily in two mice and a female *S. bovis* 60, 111, and 25·5 in three others. The cercaria of *S. bovis* was of the same size as those of *S. haematobium* and *S. mansoni* when preserved in the same manner. The details of its internal anatomy are to be the subject of a later report.

C. L.

BRUMPT (E.). Cycle évolutif du *Schistosoma bovis* (=*Bilharzia crassa*), infection spontanée du *Bullinus contortus* en Corse. [**Developmental Cycle of** *S. bovis*, **a Natural Infection of** *B. contortus* **in Corsica.**]—*C.R. Acad. Sci.* 1929. Nov. 18. Vol. 189. No. 21. pp. 879–881.

The fork-tailed cercaria of *S. bovis* resembles that of the human schistosome in this particular, in being without an oesophageal bulb and, in Corsica, in using *Bullinus contortus* as intermediate host, as does *S. haematobium* in Egypt. Accordingly fork-tailed cercariae in *B. contortus* must not be assumed to be certainly those of *S. haematobium*.

C. L.

CAWSTON (F. G.). *Schistosoma bovis* **in South Africa.** [Correspondence.] —*Lancet.* 1929. Sept. 28. pp. 690–691. [1 ref.]

LE ROUX, of the Veterinary Department, Onderstepoort, has observed that after massive doses of tartar emetic *S. bovis* is apt soon to be found dying in the lung. This may perhaps explain, it is said, the appearance of temporary colds in human beings treated with large doses of this drug.

C. L.

PRAETORIUS (G.). Besteht eine Bilharziagefahr für Deutschland ? [**Is there a Bilharzia Danger for Germany ?**]—*Muench. Med. Woch.* 1929. Dec. 6. Vol. 76. No. 49. pp. 2055–2056. [Municipal Hosp., Siloah, Hannover.]

It is concluded that no large epidemic of schistosomiasis can occur in of the establishment of local foci, and that there is no need to make the Germany, that experience and experiment are silent on the possibility infection notifiable.

C. L.

PIRIE (J. H. Harvey). **Appendicitis caused by Bilharzia.** [Correspondence.]—*Brit. Med. Jl.* 1929. July 20. p. 125.

In view of HARRIS's record of bilharzial appendicitis which he believed to be new, Pirie refers to his twenty cases already published [this *Bulletin*, Vol. 22, p. 465].

C. L.

McCoy (Oliver R.). **Seasonal Fluctuation in the Infestation of** *Planorbis trivolvis* **with Larval Trematodes.**—*Jl. Parasit.* 1928. Dec. Vol. 15. No. 2. pp. 121–126. With 1 text fig. [6 refs.] [Zool. Lab., Washington Univ., St. Louis.]

Examination of over 6,500 specimens of *Planorbis trivolvis* collected during two years from Ramona Park Lake near St. Louis, Missouri, showed a widely varying degree of infestation without relation to seasons.

C. L.

Cawston (F. G.). **Some Results of Original Research into the Treatment of Chronic Haematuria caused by** *Schistosoma haematobium* **(Bilharz) and its Associated Trematode Parasitic Worms.**—*Jl. Roy. Army Med. Corps.* 1929. Dec. Vol. 53. No. 6. pp. 416–427. [14 refs.]

This paper brings into reasonable and compact form observations contained in the many scattered papers which Cawston has written and which have already been abstracted in this *Bulletin.*

C. L.

Askanazy (M.). Die durch Schistosomen erzeugte Leberzirrhose und Milzschwellung. [**Liver Cirrhosis and Splenomegaly produced by Schistosomes.**]—*Schweiz. Med. Woch.* 1929. Jan. 19. No. 3. pp. 50–55. With 1 text fig. [19 refs.]

A summary of work done during the last fifteen years.

C. L.

Journal of the Medical Association of South Africa. 1929. Oct. 26. Vol. 3. No. 20. pp. 577–578.—**The Standard Treatment of Bilharzia.**

Careful and detailed instructions are given for the mass treatment of bilharzia patients. They are issued by the Department of Public Health. It is insisted upon that every patient shall lie down for an hour after injection whether feeling well or ill.

C. L.

Mazza (Salvador) & Bianchi (Andres E.). Notas sobre las verminosis apendiculares en Buenos Aires. [**Worms in the Vermiform Appendix.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1929. Vol. 5. No. 41. pp. 255–262. With 8 text figs. [3 refs.]

Brumpt having recorded as containing Oxyuris 3·5 to 4 per cent. of 800 appendices examined at necropsy, and 37 per cent. of those removed from children with appendicitis, the authors examined 993 specimens from two hospitals, 498 from one, 495 from the other.

Oxyuris was found in two of the former and three of the latter, that is, in 0·5 per cent. Microscopically, a local eosinophilia might be present, but not the signs of definite inflammation of the viscus. One showed wasting of the follicles and fibrosis of the submucosa.

H. Harold Scott.

i. CONNOR (Frank P.). **The Surgical Aspects of Filariasis.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 1. pp. 205–212.

ii. CHATTERJI (K. K.). **Facts bearing on the Surgical Pathology of Filariasis.**—*Ibid.* pp. 213–218. With 9 figs. on 3 plates (1 coloured).

i. This paper was written to emphasize the backward state of knowledge of some aspects of the life history of *Filaria bancrofti*, particularly the stage between infection and the reaching of adult life, and of the pathology of the condition it produces. Moreover, there is no drug which can be relied upon to kill the worms. That surgery should be needed is a confession of failure to diagnose and disinfest in the early days of infection. The ordinary methods employed are too well known to call for the author's description, but he lays stress on the need of energetic treatment of funiculitis ; in advanced cases the surgeon must not hesitate to excise testis and cord. The surgical treatment of hydrocele is described in detail.

ii. The histology of certain elephantoid tissues is described. An interesting report is that of an opened cavity which refused to heal, until the introduction of the finger extracted from its interior a smaller cyst which seems to have had a torn-off pedicle. Its fluid contents held numerous microfilariae and, as appears from a legend to a figure, many smaller cysts. Its wall, judging by another figure, had a strikingly laminated appearance.

C. L.

VAN GULIK (P. J.). Microfilariasis in de Ketaunvlakte. [**Microfilariasis in the Ketaun District.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Dec. 1. Vol. 69. No. 12. pp. 1141–1148. With 1 map & 2 figs.

After examining 2,015 individuals in this district (West Sumatra) the author concludes that the population of villages on altitudes of less than 2,300 ft. is slightly infected with *Microfilaria malayi*, Brug. In people from higher situated villages no microfilarial infection was found. The blood samples for examination (thick drops) were taken at 10 p.m.

W. J. Bais.

MOCHTAR (Achmad). Filaria-inderzoek te Benkoelen en Omstreken. [**Filaria Research in Benkoelen (Sumatra) and its Surroundings.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Oct. 1. Vol. 69. No. 10. pp. 967–974.

Of 1,051 individuals examined 12·3 per cent. were found infected. The density of the infection is higher in the country (up to 60 per cent.) than in the town (7·5 per cent.). The microfilaria found was *Mf. malayi*, Brug; it showed a nocturnal habit. Apart from eosinophilia in the blood none of the carriers showed any symptoms which could be attributed to the infection. Attempts to infect *Aëdes aegypti* with the microfilaria (made with 300 mosquitoes) yielded only negative results.

W. J. Bais.

FLU (P. C.). Over Filariasis te Weltevreden. [**Filariasis in Weltevreden.**] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Oct. 1. Vol. 69. No. 10. pp. 975–978. With 4 figs. on 1 plate. [2 refs.]

Some doubt expressed by BRUG as to the correctness of the diagnosis of *Mf. bancrofti* made by Flu in specimens examined at Weltevreden (Java) in 1921, urged the author to look over his old material and therewith to confirm his diagnosis. Moreover, the fact that in Flu's case *Culex fatigans* was easily infected with the parasite, which apparently is not possible with BRUG's *Mf. malayi*, is in support of the correctness of the author's diagnosis.

W. J. Bais.

SANDGROUND (J. H.). *Ternidens deminutus* (**Railliet & Henry**) **as a Parasite of Man in Southern Rhodesia; together with Observations and Experimental Infection Studies on an Unidentified Nematode Parasite of Man from this Region.**—*Ann. Trop. Med. & Parasit.* 1929. Apr. 26. Vol. 23. No. 1. pp. 23–32. With 1 text fig. & 1 plate. [6 refs.] [Harvard Med. School, Boston.]

A medical missionary who had spent more than 25 years in Mozambique and the eastern part of Southern Rhodesia was run down, and by the Willis salt floatation method showed strongyle eggs 72 μ to 103 μ long by 37 μ to 45 μ broad, rather pointed at one end and containing a morula. Culture resulted in an encapsuled larva a sixth to a third longer than the hookworm larva and with the tail terminating abruptly in a truncated stump. With these, infection was produced in a volunteer. Just at this time 8 worms were received by Sandground, washed from stools of a native from Southern Rhodesia, as well as his faeces in formalin which contained eggs similar to those described. The worms were *Ternidens deminutus*. Accordingly 4 cc. of carbon tetrachloride were given to the missionary with no result; nor were worms recovered from the experimental case. It is noted that the three human infections with *T. deminutus* have been in negroes from Central East Africa.

[Eggs having the appearance described and not disappearing under treatment are relatively commonly recovered from the faeces of East Indians and others by direct centrifugal floatation. By this method CHANDLER found in 10 per cent. of tea garden coolies in Darjeeling eggs which, following the reviewer, he identified as those of Trichostrongylus (this *Bulletin*, Vol. 24, p. 191).]

C. L.

FRÓES (Heitor P.). Identificação de larvas de nematoide num exsudato pleural sero-hemorragico.—*Brasil-Medico.* 1929. Sept. 21. Vol. 43. No. 38. p. 1127.

——. **Identification of Nematode Larvae in the Exudate of a Sero-Haemorrhagic Pleural Effusion.**—*Jl. Trop. Med. & Hyg.* 1930. Jan. 15. Vol. 33. No. 2. pp. 18–19.

——. Larves de *Strongyloides* dans un épanchement séro-hémorragique de la plèvre. (Note préliminaire.)—*Ann. Parasit. Humaine et Comparée.* 1930. Mar. 1. Vol. 8. No. 2. pp. 170–172. [Faculty of Med., Bahia, Brazil.]

Active unsheathed larvae were found in aspirated pleural effusion; after death centrifugal precipitates of pleural and pericardial effusions showed more. They were also present in the blood of the lungs.

"The examination of the faeces [after death] showed an enormous amount of turbulent larvae which were diagnosed as strongyloides" which on a minute study were identical in shape, form and movements with those previously found in the pleura. They were "rhabdoid" and not strongyliform. It is believed that they came to the pleura from the intestine.

C. L.

ACKERT (James E.) & NOLF (L. O.). **New Technique for collecting Intestinal Roundworms.**—Reprinted from *Science*. 1929. Sept. 27. Vol. 70. No. 1813. pp. 310–311. With 1 text fig.

This technique applies to removal of worms from the intestine of freshly killed animals only, for "as the intestine loses the body heat the mucous secretions from the intestinal glands pour into the spaces between the villi and soon all other material in the lumen of the intestine becomes embedded in viscid opaque mucus." In the freshly killed animal the intestine is rapidly removed and cut into 1-foot lengths. Over a conical nozzle fixed on a tap one end of each piece of intestine is slipped and hot water between 35° C. and 60° C. is run through. Higher or lower temperatures cause intestinal spasm. The washings are caught in an Erlenmeyer flask, preserved in 4 per cent. formalin, and examined in Jenner's stain, which the worms do not easily take up and so stand out against readily staining intestinal débris. In the two control experiments made, subsequent scraping of the mucosa gave no worms, while the flushed intestinal contents gave 319, varying in length from 3·2 mm. to 95·2 mm.

C. L.

VAN THIEL (P. H.). **The Strongyloid Larvae of Mine Worms in Man and Dog.**—*Acta Leidensia* (*Scholae Med. Tropicae*). 1928. Vol. 3. pp. 345–348.

Van Thiel gives the following as generic differences between the infective larvae of *Necator*, *Ancylostoma* and *Uncinaria*. The dorsal lining of the mouth cavity is thicker in the last two; striation of the sheath decreases in definiteness from *Necator* through *Ancylostoma* to *Uncinaria*; the tail of the sheath is sharp in *Necator* and *Ancylostoma* but blunter in *Uncinaria*; the oesophageal bulb is irregularly notched in outline in *Necator* and *Ancylostoma* but not in *Uncinaria*; in *Necator* oesophageal and intestinal lumens are wide but in the other two narrow, while a series of cells yet further narrows the lumen at the junction of the two organs; the larva of *Necator* has no lips, those of the other genera have three. Within the same genus no specific differences are detectable.

C. L.

DUKELSKY (O.) & GOLUBEWA (E.). Ueber die Natur der Allergie durch Askariden. [**The Nature of Allergy in Ascariasis.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Sept. 26. Vol. 108. No. 7/8. pp. 449–454. [7 refs.] [Microbiol. Research Inst., Education Commissariat, Moscow.]

Guineapigs were injected intravenously with the body fluid of *Ascaris megalocephala*. Some had been sensitized by previous subcutaneous injection of the same fluid, others had not and were used as

controls. The accompanying table shows the results on the two groups :—

Test dose in cc.	Weight of Animal in g.	Fatal Shock.	Non-fatal Shock.	No shock.	Totals.
		Sensitized animals.			
1·0	320	2	1	0	3
0·5	400	6	0	0	6
0·4	400	5	1	0	6
0·3	400	1	2	0	3
		Controls.			
1·0	400	0	1	0	1
1·0	320	1	0	0	1
0·5	400	0	2	0	2
0·4	400	1	2	3	6

C. L.

CHIASSERINI (Angelo). Ascaridiosi delle vie biliari. [**Ascaris in the Bile Ducts.**]—*Policlinico.* Sez. Prat. 1929. Dec. 23. Vol. 36. No. 51. pp. 1867–1868. [Civil Hosp., Venice.]

A woman of 44 years complained of severe pain in the right hypochondrium and was slightly jaundiced. Owing to the severity of the pain gall-stones were suspected and operation undertaken. An Ascaris was found in the hepatic duct and its removal resulted in cure.

H. Harold Scott.

FÜLLEBORN (F.). **On the Larval Migration of some Parasitic Nematodes in the Body of the Host and its Biological Significance.**—*Jl. Helminthology.* 1929. Mar. Vol. 7. No. 1. pp. 15–26. With 5 figs. (3 on 1 plate). [42 refs.]

Fülleborn, in a fascinating lecture, illustrated by lantern, brought into an hour's instructive entertainment a mass of material which has appeared over his signature in a number of publications.

C. L.

FAIRLEY (Keith D.), FAIRLEY (N. Hamilton) & WILLIAMS (F. Eleanor). **Some Fallacies in the Intradermal Test for Hydatid Disease.**—*Med. Jl. Australia.* 1929. Sept. 7. 16th Year. Vol. 2. No. 10. pp. 320–333. [31 refs.] [Walter & Eliza Hall Inst. of Research, Melbourne.]

In a paper recently reviewed in this *Bulletin*, K. D. Fairley showed that many patients yielding an immediate reaction to the intradermal injection of hydatid fluid revealed no other evidence of echinococcosis. The present article concerns a detailed enquiry into possible sources of error in this test, and as a result of extensive experimental and clinical observations on man undertaken at the Walter & Eliza Hall Research Institute the basis of many fallacious reactions is made clear. The authors conclude that with the old technique it was the failure to react and not the immediate reaction which was of chief clinical importance, the former finding constituting more reliable evidence of

the absence of hydatid than the latter did of its presence. An improved technique is advised and the conclusion is reached that many of the pseudo-positive results obtained in the past will in the future be avoided by adequate standardization of the antigen, by the exclusion of sensitization to host protein and infestation with other helminths, by the use of the stroke test, and the adoption of standard measurements in diagnosis. Owing to the occasional presence of pharmacologically active substances, the antigen utilized in the new technique is standardized on parasite-free patients as well as on those known to harbour echinococcal cysts. The injection is made on the outer aspect of the arm, but if the patient has been previously subjected to the test another area is chosen, as local sensitization was experimentally demonstrated to follow the repeated injection of hydatid fluid into the same locality.

The dimensions of the wheal in the immediate reaction and of the reddened area of infiltration in the delayed response are always measured. Positive reactions are recorded in wheals measuring 2·4 × 2·2 cm., doubtful reactions in wheals approximating to 2·0 × 2·2 cm., and negative reactions if the dimensions are less than these. An immediate response is regarded as of no significance in any patient yielding a triple response to the stroke test or in one giving a positive or doubtful response to the control injection of normal saline solution or sheep serum.

Group reactions dependent on infestation with other helminths were specially studied, and reference to the original paper should be made by those interested in this subject. Both immediate and delayed reactions were observed in non-hydatid patients who had at some time harboured tapeworms other than the cystic stage of *Taenia granulosa*, and some evidence was presented that similar fallacious reactions occur in association with nematode disease. For the proper interpretation of the test it thus becomes essential to exclude concomitant helminthic infestation. Other conditions such as jaundice, asthma, urticaria and pruritus were occasionally associated with pseudo-positive results, but the incidence of these reactions would have been certainly diminished by the adoption of the standard technique.

N. Hamilton Fairley.

GOODALE (Raymond H) & KRISCHNER (Harald). **Biological Tests for Hydatid Disease. A Comparison of the Casoni and Weinberg Tests.**—*Amer. Jl. Trop. Med.* 1930. Jan. Vol. 10. No. 1. pp. 71–76. [2 refs.] [Path. Dept., American Univ., Beirut.]

In this paper an attempt has been made to compare the results of the intradermal skin test and the complement fixation reaction in hydatid-infested bovines examined subsequently at autopsy. Of 44 cows in which cysts were found, 38 or 86·3 per cent. had a positive skin test and 26 or 59 per cent. yielded positive complement fixation reactions. There were 11 false positive skin tests and 10 false positive complement fixation reactions recorded in 62 non-infested animals. One of the two tests was positive in all of the cows in which hydatid cysts were found. The antigen used for both tests was prepared by filtering through a Berkefeld filter to separate the scolices, the filtrate being subsequently preserved with phenol.

[In man it is well known that carbolized fluids are unsatisfactory for the diagnosis of echinococcosis, as they lead to the development of

false reactions, while filtered hydatid fluids are less potently antigenic for complement fixation work though satisfactory for Casoni tests. For these reasons the results are of doubtful significance.]

N. Hamilton Fairley.

CANTANI (Francesco). Contributo sperimentale alla diagnostica biologica delle cisti da echinococco nell'uomo. [**Experimental Study of the Biological Diagnosis of Hydatid in Man.**]—*Riforma Med.* 1929. Nov. 23. Vol. 45. No. 47. pp. 1586, 1588, 1591–1592. [21 refs.]

Tests other than biological were tried, such as the red cell count and the degree of eosinophilia, but these are dismissed in a few words as unreliable. The main work was the testing of 21 cases by Ghedini-Weinberg's method of complement fixation. For antigen was used: (1) Human hydatid fluid kept in the cold; (2) Fresh fluid from sheep hydatid; (3) Alcoholic and ethereal extracts of the walls of human cysts. Most successful in his hands was the fluid from the human cyst without addition of any antiseptic or special treatment of any sort. It proved much better than the fluid from the sheep, while ethereal and alcoholic extracts of the cyst-membrane had practically no antigenic power.

H. Harold Scott.

VON BASSEWITZ (E.) & VON BASSEWITZ (Baroneza). A cuti-reacção echinococcica no diagnostico da enfermidade hydatidica. [**The Cuti-Reaction in the Diagnosis of Hydatid Infection.**]—*Brasil-Medico.* 1929. Sept. 21. Vol. 43. No. 38. pp. 1138–1142.

Twenty-two years ago the presence of hydatid disease was noted in Rio Grande do Sul. Since then the infection seems to have been continuously increasing. The authors find that intracutaneous injection of 0·1–0·3 cc. of human hydatid fluid sterilized by boiling and adding 2 per cent. chloroform produces a definite allergic reaction in positive cases. The facts that the test may be negative in cases of suppurating cysts and may remain positive for a varying length of time after removal are not sufficient to destroy its value. It is suggested that the test should be tried on all the inhabitants of districts where the disease is known to exist, partly to determine the incidence of the infection and partly to enable the cysts to be dealt with at an early stage. Often when the reaction has been positive, the patient has appeared to be in good health, but careful examination has revealed the presence of a cyst too small to give rise to symptoms.

H. Harold Scott.

LOLLI (Giorgio). La cura medica delle cisti d'echinococco. [**Medical Treatment of Hydatid.**]—*Policlinico.* Sez. Med. 1929. Dec. 1. Vol. 36. No. 12. pp. 643–648. With 3 text figs. [7 refs.] [Inst. of Clin. Med., Univ., Rome.]

The author planned to test the result of energetic treatment with neosalvarsan on patients with hydatid, and, if ineffectual, to remove the cyst and examine the fluid to see whether the drug was present or not, to test by experimental inoculation whether the vitality of the

cyst had been affected by the drug, and to study the effect of injection of neosalvarsan with scolices into the peritoneal cavity of a rabbit. He found that neosalvarsan had not the least effect on the course of hydatid in man ; it does not affect its vitality, since, when inoculated into rabbits, the contents give rise to fresh cyst formation. Even when the hydatid material is injected simultaneously with the drug, evolution of the cyst is not impeded.

H. Harold Scott.

ERISTAWI (K.). Zwei seltene Echinococcusfälle. [**Two Rare Cases of Echinococcus Infestation.**]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1929. Jan. Vol. 2. No. 1. [In Georgian script. German summary p. 71.]

Case 1. Boy of 9, no eosinophilia or Weinberg, positive intracutaneous reaction to hydatid antigen. Operation for a cyst in the liver was followed by high fever and an erythema covering the whole body, with unconsciousness. These disappeared, but his hair and nails fell out.

Case 2. Man of 27, without Weinberg or intracutaneous reactions, eosinophils 3 per cent., a non-fluctuating liver tumour from which puncture released no fluid. Operation showed a cavity in the liver packed tight with tiny echinococcus vesicles. Recovery.

C. L.

SCHILLING (Viktor). Interessante Fälle von Eosinophilie durch Würmer. I. Glossitis, Allergie und hohe Eosinophilie durch abgestorbenen Bandwurm. II. Biologische Kurve der Leukocyten bei Echinokokkenperitonitis. [**Interesting Cases of Eosinophilia caused by Worms.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26 (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 481–492. With 2 charts in text. [1 ref.] [I. Med. Clinic, Berlin.]

I. The explanation of an eosinophilia of 53·5 per cent. with stomatitis and intestinal catarrh, but with no helminthic eggs found in the stools, was cleared up when next day the patient brought in a headless, much macerated strobilus of *T. solium* whose uteri contained no ripe eggs.

II. A hepatic cyst forming a hypochondriac bulge as big as an orange and accompanied by no eosinophilia burst into the peritoneal cavity while under observation. It took a week before eosinophils were invariably to be found in the blood; after about a fortnight they began to increase markedly, and in three weeks they were over 40 per cent. of all leucocytes. Detailed charts show the leucocytic counts and the dates of four paracenteses.

C. L.

ALEXEIEFF (Georges). Sur la question de la clinique de l'ankylostomiase.—*Pensée Méd. d' Usbéquistane et de Turqumenistane.* Tashkent. 1929. Aug.–Sept. No. 11–12. pp. 28–43. [22 refs.] [In Russian. French summary pp. 124–125.]

BRUMPT (E.). Rôle des bilharzies dans la production de certains cancers. Etude critique à propos d'un cas nouveau.—*Ann. Parasit. Humaine et Comparée.* 1930. Jan. 1. Vol. 8. No. 1. pp. 75–101. With 10 text figs. [51 refs.] [Parasit. Lab., Faculty of Med., Paris.]

CAWSTON (F. Gordon). Some Simple Truths in the Study of Schistosomiasis.—*Prescriber.* 1929. Aug. Vol. 23. No. 8. pp. 265–266.

COUTELEN (F.). Les cancers parasitaires d'origine bilharzienne et leur prophylaxie.—*La Lutte contre le Cancer.* 1929. Vol. 7. p. 319. [Summarized in *Bull. Inst. Pasteur.* 1929. Nov. 30. Vol. 27. No. 22. p. 1010.]

FAMULARI (S.). Il tetracloruro di carbonio nella cura dell'anchilostomiasi.—*Arch. Ital. Sci. Med. Colon.* 1928. May. Vol. 9. No. 5. pp. 288–291. [1 ref.] [Inst. of Path. & Clin. Med., Univ., Messina.]

HASSLER (E.). Ueber Hakenwurminfektion und volkstümliche Antihelminthica in Paraguay.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Aug. Vol. 32. No. 8. pp. 409–410. [1 ref.]

HOEPPLI (R.). Ueber Beziehungen zwischen degenerativen Gewebsveränderungen und Ausscheidungen parasitischer Nematoden.—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26 (D., Med. & Vet. Vol. 2). [Festchrift NOCHT.] pp. 177–183. [15 refs.] [Univ., Amoy, China.]

KESSLER (Ad.). Kurze Mitteilungen ueber Behandlung wurminfizierter Patienten mit Thymol.—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927, Vol. 26 (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 229–231. [3 refs.]

LIU (K. B.). Schistosomiasis Japonicum (Report of a Case).—*China Med. Jl.* 1929. Aug. Vol. 43. No. 8. pp. 812–815. [3 refs.] [General Hosp., Wuhu, An.]

MIYASAKI (Satoru). Ueber die sog. "Lebersperre" bei Anchylostomiasis.—*Okayama-Igakkai Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1928. Oct. Vol. 40. No. 10 (465). pp. 2235–2243. [27 refs.] [In Japanese. German summary p. 2244.] [Med. Clinic, Univ., Okayama.]

MOLLOW (W.). Ueber das Seretin, einen reinen Tetrachlorkohlenstoff, als Wurmabtreibungsmittel.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 329–330. [1 ref.] [Internal Clinic, Univ., Sofia, Bulgaria.]

NEVEU-LEMAIRE (Endjum). Répartition de la bilharziose vésicale en Irak.—*Ann. Parasit. Humaine et Comparée.* 1929. Jan. 1. Vol. 7. No. 1. pp. 1–9. With 1 folding map. [9 refs.] [Parasit. Lab., Faculty of Med., Paris.]

ŌBA (T.). On the Morphological Changes of the Blood in Ancylostomiasis and Necatoriasis of Man.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. Mar. No. 288. [In Japanese. English summary pp. 17–18.] [Taihoku Hosp., Taihoku.]

RAYNAL (J.). Sur trois parasitoses à élimination intestinale, fréquentes en milieu colonial indigène : (uncinariose, distomatose et bilharziose).—*Rev. Prat. Malad. des Pays Chauds.* 1929. Oct. Year 8. Vol. 9. No. 10. pp. 459–462, 465–470.

REVISTA DE LA CONFERENCIA SANITARIA NACIONAL. Caracas. 1930. Jan. Vol. 1. No. 2. 64 pp.—Programa para el año de 1930 : Anquilostomiasis en Venezuela.

SUKHAVANAM (B.). Roundworm Infection simulating Appendicitis.—*Indian Med. Gaz.* 1929. May. Vol. 64. No. 5. p. 261.

TIMPANO (P.). La cura dell'anchilostomiasi col tetracloruro di carbonio.—*Policlinico.* Sez. Prat. 1929. Mar. 11. Vol. 36. No. 10. pp. 341–343.

YELLOW FEVER.

CAZANOVE (F.). Etudes sur la fièvre jaune. [**Studies on Yellow Fever.**] —*Bull. Soc. Path. Exot.* 1929. Nov. 13. Vol. 22. No. 9. pp. 793–817.

The author gives some clinical observations on cases of yellow fever observed at Dakar in 1927. The analysis of urine was found to be of considerable value for prognosis ; diminution of albumin was a favourable sign, the quicker the better, and the elimination of chlorides also was favourable. The appearance of bile pigments is a signal of the crisis. The sudden crisis of intoxication is followed in cases of recovery, by an equally sudden disintoxication. In some cases of yellow fever the appearance of albumin in the urine is either prolonged or delayed until after the crisis.

Particulars are given of the use of Noguchi's leptospiral vaccine and serum in Senegal, both of which were found to be without effect for either prevention or treatment.

E. Hindle.

CAZANOVE (F.). Les cas légers de fièvre jaune. [**Mild Cases of Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 161–167.

A description of the clinical symptoms of six mild cases of yellow fever occurring in 1927 at Dakar. Three of these showed complete symptoms of the disease, and the other three only the symptoms of the first period.

Attention is called to the extreme difficulty, apart from animal experiments, of distinguishing between dengue and some of these mild cases of yellow fever and its bearing on the question of prophylaxis.

E. H.

WARNER (R. A.). **A Case of Yellow Fever among Personnel attached to the United States Naval Mission to Brazil.**—*U.S. Nav. Med. Bull.* 1929. July–Oct. Vol. 27. Nos. 3–4. pp. 786–789.

The record of a case of fever, accompanied by jaundice and albuminuria, occurring in a member of the United States Naval Mission to Brazil. The disease clinically resembled yellow fever, but the blood serum of the patient was tested by Dr. W. A. SAWYER and found to confer no protection to monkeys subsequently inoculated with yellow fever virus. The patient had been vaccinated against yellow fever eight days previously, but in view of the results of the tests in monkeys, the fact that jaundice persisted for nearly two months after the attack, and the occurrence of a relapse, spirochaetal jaundice is more probable.

E. H.

COWDRY (E. V.) & KITCHEN (S. F.). **Intranuclear Inclusions in Yellow Fever.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 227–299. With 57 figs. on 6 plates (2 coloured). [4 pages of refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

A very detailed account of the intranuclear inclusions occurring in the liver cells of monkeys and human beings infected with yellow fever [see this *Bulletin*, Vol. 26, p. 301], together with a comparison of the inclusions with those in cases of herpes, chickenpox, submaxillary disease

and Virus III. The paper should be read in its entirety by those interested in the subject, as it includes cytological and experimental details that do not readily lend themselves to abstraction.

The inclusions are formed in the nucleoplasm of the affected hepatic cells as a result of chemical and physical changes and mass movements produced in the nuclei through the direct or indirect action of the virus. The bodies are very readily observed in the living cells, as owing to the extreme necrosis of the liver it is easy in a cover glass preparation to see the separate liver cells and their contents. In the living state the inclusion bodies are readily dissolved, a dilution of only 0·05 per cent. acetic acid causing their immediate disappearance. 1 per cent. ammonia also dissolves them, but more slowly. Distilled water caused swelling of the nucleus, but the relative position of the bodies remained unchanged; 8·5 per cent. NaCl followed by distilled water to restore the shape of the nuclei, also had no effect on the bodies. On the contrary, when the bodies are fixed by Zenker, Bouin, or any other of the ordinary methods they become extraordinarily resistant to the action of solvents. Zenker, containing 5 per cent. acetic acid, was found to be the best fixative for ordinary use. The inclusions were not seen in a monkey killed 24 hours after being inoculated with virus, but were found in those killed on the first day of fever and also in animals dying of the disease as late as 22 days after being inoculated. They were not found in a monkey killed 3 days after the last fever. With the exception of very rare cases in which a few suprarenal cells showed the bodies, they are confined to the liver cells, and many attempts to produce the inclusions by inoculating the virus directly into the other organs of monkeys, and in other species of animals, were unsuccessful. Herpetic inclusions produced in the liver of a Cebus monkey were found to differ structurally from those of yellow fever. The latter appear as individual spherical clumps of fine particles, and the nucleoli persist, but in herpes they are more or less even cloud-like deposits of acidophilic particles and the nucleoli are destroyed, or else emarginate on the nuclear membrane.

A comparison was also made with the inclusion bodies in chickenpox, submaxillary disease, and Virus III disease, in addition to the above, and microchemically the bodies found to be alike in many particulars, especially in being acidophilic, so that they can all be stained by basic dyes. The inclusion bodies were found in 10 out of 39 human cases of yellow fever, but although present in man they are seldom so abundant as in monkeys, and are not so useful for the diagnosis of doubtful cases as in the case of monkeys. This difference in the incidence of inclusion bodies is correlated with other differences in the hepatic lesions. In man: (1) The midzonal necrosis is slightly less extensive and the central border of non-necrotic cells is more frequently greater than the peripheral border in human livers, than in monkeys. (2) The cellular response is different, macrophages outnumbering polymorphs. (3) The fatty change is less extensive. (4) Pigmentation is more marked. (5) Hyaline bodies are more conspicuous. (6) The maximum and average nuclear size are greater. (7) The type of nuclear change is different; lysis is more evident than rhexis. (8) Nuclear budding is seen. (9) Empty nuclei are fairly abundant. (10) Vesiculated nuclei are common. (11) Mitoses are less frequent. (12) The number of nucleoli is increased, and also they are hypertrophied to a much greater degree.

The detailed examination of infected mosquitoes did not result in the discovery of any inclusion bodies, or of any micro-organisms likely to be of aetiological significance in this disease.

The general conclusions are that the nuclear response of the liver cells in yellow fever is of the same general type, though different in detail from that occurring in many other virus diseases, especially chickenpox, herpes, virus III disease, and submaxillary disease.

E. H.

TORRES (C. Magarinos). Morphologie des inclusions hépatiques dans la fièvre jaune humaine. [**The Morphology of the Hepatic Inclusions in Human Cases of Yellow Fever.**]—*C. R. Soc. Biol.* 1929. Nov. 4. Vol. 102. No. 28. pp. 410–412. With 1 text fig. [Oswaldo Cruz. Inst., Rio de Janeiro.]

The author has found the characteristic intranuclear bodies in the liver cells of a yellow fever patient in Brazil, who died about 40 hours after first showing symptoms of the disease. Seven other patients, of whom four had certainly died after the third day of the disease, showed no signs of any nuclear changes in the liver. The author is of the opinion that the appearance of intranuclear bodies in the human liver is associated with the presence of virus in the tissues.

E. H.

TORRES (C. Magarinos). Altérations du nucléole des cellules du foie dans la fièvre jaune. [**Alterations in the Nucleolus of Liver Cells in Yellow Fever.**]—*C.R. Soc. Biol.* 1929. Nov. 4. Vol. 102. No. 28. pp. 414–415. With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro.]

The author states that sections stained with haematoxylin and eosin are not sufficient, at any rate with human tissue, to distinguish the characteristic intranuclear bodies of yellow fever from hypertrophy of the nucleolus. It is necessary to employ special methods such as that used by GOODPASTURE for Negri bodies, when the intranuclear bodies can be clearly differentiated from altered nucleoli. This method consists of staining in anilin carbol fuchsin, differentiating with alcohol, and finally staining with Loeffler's alkaline blue. With this method the nucleoli and also any fragments of it are coloured red, whilst the intranuclear bodies characteristic of yellow fever are coloured a violet-blue.

E. H.

PENNA (Oswino) & DE FIGUEIREDO (Burle). Diagnostico histopathologico da febre amarella pelas lesões de Councilman. [**Histological Diagnosis of Yellow Fever by the Presence of "Councilman's Lesions."**]—*Brasil-Medico.* 1929. Dec. 21. Vol. 43. No. 51. pp. 1549–1550. [Oswaldo Cruz Inst., Rio de Janeiro.]

The criteria adopted by the authors for establishing a post-mortem diagnosis of yellow fever are: necrosis of hepatic cells and, scattered among such cells, others isolated which have not necrosed. The dead cells become separated from their neighbours, take on a more or less ovoid shape, their protoplasm is acidophil, the cytoplasm becomes hyaline and loses granularity, contains fat, and the nucleus is pycnotic, karyorrhectic or karyolytic. The oxychromatic granulations, described by TORRES, COWDRY and KITCHEN, they regard as the sign *par excellence* of yellow fever, but they give priority of description to COUNCILMAN.

H. Harold Scott.

TEIXEIRA (J. Castro). [In Portuguese & English.] Do funccionamento renal no febre amarella, na convalescença e após a cura. **Functional Test of Kidney in Yellow Fever during Convalescence and after Treatment.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1929. Jan. & Feb. No. 5. In Portuguese pp. 38–41. With 9 graphs on 9 plates. [5 refs.] In English pp. 42–45. [5 refs.]

The author gives the results of testing the renal functions of four convalescent yellow fever patients and five that had completely

recovered. The former showed delay in water elimination and disturbance in dilution and concentration power ; there was fair elimination of chlorides and urea. The Aldrich and MacClure test showed a slight tendency of the tissues to hydrophily, the figures ranging from 37 to 46 instead of the normal 60.

During convalescence the phenolsulphophthalein test showed an average elimination during the first hour of 45·2 per cent., whilst the recovered patients gave the normal average of 65 per cent. after the same interval. The restoring of renal function seems therefore to be rapid and complete in the case of yellow fever.

E. H.

CRUZ (J. da Costa). Variations des différentes fractions de l'alexine dans la fièvre jaune. [**Variations in the Different Fractions of Complement in Yellow Fever.**]—*C.R. Soc. Biol.* 1929. Oct. 18. Vol. 102. No. 26. pp. 51–53. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro.]

The reduction in the amount of complement in yellow fever patients previously noted by the author [see this *Bulletin*, Vol. 26, p. 1003] was investigated in two cases to see whether the globulin or albumin fractions were affected. The results show that the albumin fraction of the complement is the one that is reduced, the globulin fraction being little affected.

E. H.

MULLER (Henry R.) & TILDEN (Evelyn B.). *Leptospira icteroides* **and Brazilian Yellow Fever.**—*Jl. Amer. Med. Assoc.* 1930. Mar. 22. Vol. 94. No. 12. pp. 856–857. [2 refs.] [Rockefeller Inst. for Med. Research, New York.]

Cultures were made of 66 samples of blood from cases diagnosed as yellow fever in Rio de Janeiro. The blood in every case had been collected during the first 4 days of fever, mixed with sodium citrate, and sent to New York in ship's refrigerators, the journey taking three to five weeks. *Leptospira icteroides* was cultured from the blood of two of these patients, one of whom died of typical yellow fever, and the other suffered from a severe attack of the disease. It is suggested that either Weil's disease and yellow fever may be confused clinically, or that in certain cases of yellow fever, *Spirochaeta icterohaemorrhagiae* appears in the blood as a secondary invading micro-organism.

E. H.

KUCZYNSKI (Max H.) & HOHENADEL (Bianca). **Investigations into the Etiology of Yellow Fever with Special Reference to the Problem of Insect-borne Diseases.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Mar. 17. Vol. 23. No. 5. pp. 439–486. With 16 charts & 3 figs. on 1 plate. [12 refs.]

An important contribution to the experimental study of yellow fever. Particulars are given of the course of the disease in 272 rhesus monkeys, of which 257 died. The authors recommend the use of blood collected by heart puncture during the first 24 hours of fever, for maintaining the disease in passage, although both fresh liver emulsion and the bites

of infected mosquitoes are equally fatal. In studying the pathological changes in these animals there is one very marked difference from man, for infected monkeys continue to feed until the last day of the disease, whilst even in mild cases human beings refuse nourishment, and consequently there is an early change in the blood and a decrease in its sugar content.

The authors confirm their previous observations as to the extreme susceptibility of marmosets and saimiri monkeys, but find that Cynomolgus shows considerable variation in its susceptibility. They also find that the West African green monkey, *Cercopithecus* sp., can be infected in the laboratory with yellow fever from rhesus monkeys. Five passages were made in Cercopithecus monkeys and rhesus monkeys were infected from them on three occasions. The illness is much milder then in rhesus. In Cebus the type of infection was found to be quite different from that in other monkeys. Extreme hepatic glycopenia and consequent necrobiosis of the liver cells was completely lacking even in fatal infections, and in cases where the blood harboured the virus for 8 to 10 days.

The guineapig was also found to be susceptible to infection with yellow fever, the best results being obtained by a preliminary poisoning with phlorhidzin. The intraperitoneal inoculation of 2 cc. daily of a saturated solution for 4 to 7 days, followed by an inoculation of infected monkey's blood, is the most certain method of producing infections. Many of these were fatal and the animals showed fatty degeneration of the liver, due to the phlorhidzin, but without necrosis. Numerous gastric ulcers are often visible, and sometimes black haemorrhages in the stomach and haemorrhages in the lungs. Some of the animals showed fever and many of them died of the infection after intervals ranging from 4 to 26 days after being infected. The authors were successful in maintaining yellow fever in guineapigs through six or seven passages from animal to animal, and at the same time repeatedly reproduced the infection in rhesus monkeys by the injection of liver or, with less certainty, blood, of these infected guineapigs.

The pathological changes produced in guineapigs by yellow fever are discussed in detail and an interesting parallel drawn between the "autonomic-gastric" effect of *Corynebacterium diphtheriae* and that of the diphtheroid *B. hepatodystrophicans*. Sometimes by injection of liver from dying guineapigs other guineapigs were killed in 16 to 40 hours with extreme paralysis of the intestines, and occasionally with gastric ulcers and haemorrhages in the stomach. There are stated to be two distinct poisonous effects observed in yellow fever: a purely hepatodystrophic effect, which appears to be intimately connected with the metabolism of sugar, and a nervous effect.

Further evidence is brought forward in support of the authors' view that *B. hepatodystrophicans* is the causative organism of yellow fever. One monkey was inoculated with a 17th subculture of the organism that had been kept in culture for 13½ months and the animal died of yellow fever on the 24th day after being inoculated, only showing fever on the 23rd day of the disease. A second monkey inoculated with a 12th subculture died of yellow fever on the 33rd day. A third monkey infected from a culture of the Brazilian virus survived, but blood collected on the 30th day after the inoculation produced a fatal infection in another monkey.

Guineapigs were also infected by cultures, and from one of these animals a monkey was successfully infected with yellow fever.

These and other experiments dealing with the cultural problem are discussed in detail, and in particular the view that live virus might be present in culture tubes together with bacteria. The cultural forms were found to withstand exposure to 0·4 per cent. phenol at room temperature or at room temperature for 5 to 12 days, and yellow fever was produced in monkeys by the repeated inoculation of these phenolized cultures. The site of the virus is next discussed and evidence brought forward supporting the view that it is present in the leucocytes and especially in the monocytes. An interesting experiment supports this view. One of the assistants at the laboratory suffered from a mild attack of yellow fever, with a rise in temperature for 4 days. Four days after the temperature had returned to normal 1 cc. of the patient's blood was mixed with citrate and centrifuged. The citrate plasma was removed and found to be non-infective. The greyish layer of monocytes and leucocytes was then washed twice in physiological saline solution and then inoculated into a monkey which died of yellow fever eight days later.

The article concludes with a discussion of the cultural problem in relation to the authors' former work on typhus.

In the discussion following the paper, Dr. HINDLE described experiments showing that yellow fever virus could be adsorbed by bacilli and suggested that this might be an explanation of some of the positive results obtained by inoculation of subcultures after passage. Dr. OKELL mentioned that he had inoculated 12 guineapigs with large doses of yellow fever virus, but without producing any signs of infection.

E. H.

i. CRUZ (J. da Costa). Sur l'étiologie de la fièvre jaune (*Bacillus hepato-dystrophicans* Kuczynski, 1929). [**On the Aetiology of Yellow Fever** (*Bacillus hepato-dystrophicans* **Kuczynski, 1929.**]—*C.R. Soc. Biol.* 1929. Nov. 22. Vol. 102. No. 31. pp. 610–613. [2 refs.] [Oswaldo Cruz Inst., Rio de Janeiro.]

ii. KUCZYNSKI. A propos de la note de M. J. da Costa Cruz sur l'étiologie de la fièvre jaune. [**Concerning da Costa Cruz's Note on the Aetiology of Yellow Fever.**]—*Ibid.* pp. 613–614.

i. The first paper contains an account of observations on a culture of *Bacillus hepatodystrophicans* strain No. 645, obtained from KUCZYNSKI. The morphology of the organism agrees with the previous descriptions. [See this *Bulletin*, Vol. 26, p. 296.] The characters of the cultures are then discussed in detail and it was found that in ordinary media the organism does not develop under aerobic conditions.

With the special media recommended by KUCZYNSKI and in the presence of pieces of organs, the bacillus grew in 2 or 3 days. In the absence of organs the organism only developed when a large quantity of the original culture was introduced, and then it only grew slowly in the top layer of the tubes. Various media were tried and the most satisfactory found to be acid broth containing 1 per cent. glucose with a pH of 6·4. Cultures in this medium furnished abundant growth after 24 to 48 hours, when incubated at 37° C., but only if the cultures were kept under anaerobic conditions.

The fermentation of various sugars was tested in Martin's peptone solution containing 1 per cent. of the sugar. There was intense fermentation of glucose, glycerine and galactose, producing acid but no gas. Growth in

the presence of maltose, mannite, arabinose, raffinose, inulin, dextrose, lactose or saccharose was extremely slow, without any obvious change in the media. The bacillus did not coagulate milk or liquefy gelatine. Cultures were killed by exposure to 55° C. for 30 minutes, but lived for 20 minutes. A mixture of cultures was filtered through a Chamberland F filter at a pressure of 40 cm. of mercury. The filtrate was sterile, all the bacilli being retained by the filter.

The cultures were found to be entirely non-pathogenic when inoculated into mice, guineapigs, rabbits and *Macacus rhesus*. It was found that suspensions of the bacillus were agglutinated by both normal and yellow fever serum of human beings. Hyperimmune serum from a monkey in dilutions of 1 : 20 had no effect on the bacillus. Two *Macacus rhesus* were inoculated, one with 5 cc. and the other with 10 cc. of a rich culture in broth, without any result ; 20 days later when inoculated with yellow fever virus they both succumbed to typical infections of the disease.

The author concludes that his results show that this bacillus has no aetiological relation to yellow fever, but its properties suggest that it is a diphtheroid bacillus closely related to *Corynebacterium lymphophilium* Torrey, 1916.

ii. In his reply Professor Kuczynski stated that he had obtained undoubted cases of yellow fever in monkeys by the inoculation of cultures 6–8 months after being isolated. A further note by Dr. da Costa Cruz emphasizes the fact that, apart from their non-pathogenicity, no antigenic relation with yellow fever could be discovered in the cultures studied by him.

E. H.

Kuczynski (Max H.), Hohenadel (Bianca) & MacClure (Ed.). Versuche mit alten Kulturen des Bacillus hepatodystrophicans. [**Experiments with Old Cultures of** *B. hepatodystrophicans.*]—*Klin. Woch.* 1929. Oct. 15. Vol. 8. No. 42. pp. 1960–1961.

——, —— & ——. Gelbfieber in amerikanischen Affen. [**Yellow Fever in American Monkeys.**]—*Ibid.* pp. 1961–1962.

The first paper contains a record of the infection of a rhesus monkey with yellow fever by the inoculation of old cultures. The monkey was inoculated with the 7th subculture of a Berlin strain, and 7 days later reinoculated with 7·5 cc. of a mixture of four cultures, two being 4th, one a 7th and the other an 8th subculture. These cultures had been maintained for 145 to 258 days and immediately prior to inoculation had been kept from 104 to 127 days without any subcultures being made. After this second inoculation, 7 days later the monkey showed two days of fever and then died of typical yellow fever.

The second paper contains records of the successful infection with yellow fever of 3 species of American monkeys. Cebus shows a somewhat atypical infection, but the virus was passed through five of these animals in succession and afterwards produced a typical and fatal infection in a rhesus monkey.

Saimiri (*Chrysothrix*) *sciureus*, the squirrel monkey, was found to be extremely susceptible, and the pathological changes closely resembled those occurring in human beings. The animals usually die of the disease within 3 days of being inoculated.

Callithrix jacchus, the common marmoset, was also found to be very susceptible to the disease, and details are given of the passage of the

virus alternately through marmosets and rhesus monkeys. The infection seems to be very severe in this species, all the recorded cases being fatal and the animals showed marked haemorrhages, especially in the large intestine.

E. H.

KUCZYNSKI (Max H.), HOHENADEL (Bianca) & MACCLURE (Ed.). Experimentelle Gelbfieberinfektion amerikanischer Affen wie des Rhesus mit Kulturen des *B. hepatodystrophicans*. [**Experimental Infection of American Monkeys and also Rhesus with Yellow Fever by Means of Cultures of** *B. hepatodystrophicans*.]—*Klin. Woch.* 1930. Jan. 18. Vol. 9. No. 3. pp. 108–110.

The authors succeeded in infecting marmosets and squirrel monkeys, as well as rhesus monkeys, by means of injections of cultures of *B. hepatodystrophicans*. The South American monkeys were all found to be very heavily parasitized, and in addition to various worm infections generally showed secondary pathological changes in the alimentary canal and viscera. As a result it was impossible to obtain pure cultures from the tissues of these animals. Two lots of cultures were tested: the first a Berlin strain that had been cultured for 6 to 10 months, and the second a Brazilian strain cultured for more than 2 months. Fourteen marmosets were inoculated, 7 with each of these strains of cultures. One of those inoculated with the Berlin strain died of typical yellow fever on the ninth day, whilst a parallel monkey that received the same dose died on the same day without any signs of this disease. Similar results were obtained with the Brazilian strain.

The authors discuss the results of their culture inoculation experiments and put forward the view that there may be two kinds of infection produced in monkeys, one the result of the cultural, bacillary form, and the other the result of the virus which develops from the bacillary form. The latter produces typical symptoms of yellow fever, or causes the development of immunity, whilst the former is of low pathogenicity, but may produce febrile symptoms (unlike those in typical yellow fever, however) and exceptionally cause the death of the animal. The marmoset was found to be particularly susceptible to yellow fever infection, and is recommended for use in the diagnosis of cases of this disease in South America.

E. H.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **The Location of Yellow Fever Virus in Infected Mosquitoes and the Possibility of Hereditary Transmission.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 335–344. [9 refs.] [Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

An interesting miscellaneous series of experiments on the infectivity of various parts of mosquitoes infected with yellow fever. The virus was found in the head, thorax, and abdomen of mosquitoes before their bites were infective. Infection was obtained by the inoculation respectively of legs, ovaries, salivary glands, mid guts and hind guts of infected *Aëdes aegypti*. No transmission was obtained from the inoculation of haemocoelic fluid or of the mouthparts, and also a few attempts to produce infection by the faeces were all negative. Although the ovaries contained virus, the inoculation into monkeys of large

numbers of eggs laid by infected mosquitoes never resulted in the production of either yellow fever or immunity against the infection, and no evidence was obtained in support of the view that hereditary transmission may take place. Adults bred from larvae that had been fed on infected mosquitoes also failed to acquire the infection.

E. H.

ARAGÃO (H. de Beaurepaire) & LIMA (A. da Costa). [In Portuguese & English.] Sobre o poder infectante da haemolympha de mosquitos contaminados com o virus da febre amarella. **On the Contamination of Haemolymph in Mosquitoes infected by the Yellow Fever Virus.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1929. Aug. 31. No. 10. In Portuguese pp. 251–252. With 3 figs. on 1 plate. [1 ref.] In English pp. 253–255.

The authors twice infected monkeys with yellow fever by inoculating them with the legs of infected mosquitoes. They point out that the results of these experiments do not necessarily indicate infection of the contained haemolymph, as the insects had walked over infected faeces and consequently the surface of the legs might have been contaminated. Accordingly in a third experiment the haemolymph was removed from 8 infected mosquitoes, by means of a very fine micropipette, in order to eliminate the possibility of surface contamination. A monkey inoculated with this haemolymph died 7 days later with typical lesions of yellow fever.

E. H.

PHILIP (Cornelius B.). **Possibility of Hereditary Transmission of Yellow Fever Virus by** *Aedes aegypti* **(Linn.).**—*Jl. Experim. Med.* 1929. Dec. 1. Vol. 50. No. 6. pp. 703–708. [5 refs.] [Internat. Health Division, Rockefeller Foundation, Lagos.]

The author made several attempts to obtain passage of yellow fever virus from infected *Aëdes aegypti* to their offspring, but obtained uniformly negative results. The subcutaneous injection of 200 eggs laid by an infective batch of mosquitoes at varying intervals after the first, second, and fourth blood meals produced no reaction in six normal rhesus monkeys. Negative results were also obtained in five biting and two inoculation experiments with the adults that hatched from other eggs laid by the same infective lot of mosquitoes. It is evident, therefore, that under the conditions of this experiment hereditary transmission is highly improbable, for variations in the age and number of blood-meals of the parent and offspring mosquitoes had no effect in producing passage of the virus from one stage of the insect to another.

E. H.

PHILIP (Cornelius B.). **Studies on Transmission of Experimental Yellow Fever by Mosquitoes other than Aëdes.**—*Amer. Jl. Trop. Med.* 1930. Jan. Vol. 10. No. 1. pp. 1–16. [7 refs.]

The author finds that *Taeniorhynchus* (*Mansonioides*) *africanus*, Theo., is capable of transmitting yellow fever, for monkeys were infected both by the bites of these mosquitoes and also by the injection of their ground up bodies. Out of four monkeys infected by the

bites of infected Taeniorhynchus three died and one recovered, and out of six infected by the inoculation of the ground up insects, five monkeys died of yellow fever. One insect was sufficient to cause a fatal infection. The incubation period of the virus in this species was not determined owing to the low percentage of infection, but the shortest positive transmission by biting occurred after 16 days. Parallel tests with *A. aegypti* resulted in these insects becoming infected eight and nine days respectively after the original infective meal.

Attempts were made to infect *Anopheles gambiae*, Giles (=*costalis*, Lw.), but the virus only persisted in the gut of the mosquito for a maximum period of four days, and the bites were never infective. It is evident, therefore, that this species is not concerned in the transmission of yellow fever in West Africa. On the other hand, *Taeniorhynchus africanus* must be definitely considered in the control of the disease, as it is an important domestic mosquito, readily biting human beings, and experimentally has been shown capable of transmitting the infection.

E. H.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **Studies on Yellow Fever in South America. IV. Transmission Experiments with** *Aëdes aegypti.*—*Jl. Experim. Med.* 1929. Dec. 1. Vol. 50. No. 6. pp. 793–801. [4 refs.] [Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

A record of mosquito transmission experiments, using both Brazilian and African strains of yellow fever. 18 fatal infections were produced in monkeys by the bites or injection of infected mosquitoes, 15 due to Brazilian strains and 3 to an African strain, compared with 17 non-fatal infections produced by Brazilian strains. The results of these experiments are difficult to interpret, for although some of the failures are the result of the monkeys being naturally immune, the authors' general experiences show that such animals only account for a part of the total failure in the mosquito transmission. Whereas only 50 per cent. of the mosquito transmission experiments were successful, over 80 per cent. of the blood transfers at the same time were positive. The monkeys which failed to show fever following the bites of presumably infected mosquitoes, later proved resistant to the inoculation of blood or tissues containing virus. This suggests that these monkeys may have been immunized by subinfective doses of virus with or without a slight rise in temperature. The incubation period in monkeys infected by the bites of infected mosquitoes varied from less than 24 hours to 15 days, and as a rule was longer in non-fatal than in fatal infections.

E. H.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **Studies on Yellow Fever in South America. V. Transmission Experiments with Certain Species of Culex and Aëdes.**—*Jl. Experim. Med.* 1929. Dec. 1. Vol. 50. No. 6. pp. 803–808. [6 refs.] [Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The authors' experiments show that *Aëdes* (*Ochlerotatus*) *scapularis*, a widely distributed South American species, is capable of transmitting yellow fever virus from monkey to monkey by its bite.

In addition, fatal infections were produced by the injection of the ground-up bodies of both this species and *Aëdes* (*Ochlerotatus*) *serratus*, which had fed about one month previously on an infected monkey, and a mild infection by a similar injection of *Aëdes* (*Taeniorhynchus*) *taeniorhynchus*. No definite infection was produced in experiments with *Culex quinquefascialus*, but some of the monkeys bitten by this species were relatively immune to the subsequent inoculation of virus.

E. H.

EVANS (A. M.). *Aëdes* (*Aëdimorphus*) *apicoannulatus* **Edwards and Yellow Fever : a Correction.**—*Ann. Trop. Med. & Parasit.* 1929. Dec. 31. Vol. 23. No. 4. pp. 521–522. [5 refs.]

The examination of specimens of mosquitoes received from a member of the West African Yellow Fever Commission makes it certain that the species referred to as *Aëdes* (*Aëdimorphus*) *apicoannulatus* in BAUER's transmission experiments [see this *Bulletin*, Vol. 25, p. 848] was really another species, *Aëdes occidentalis*, named by the author in 1926. Unfortunately this latter name has been found to have been preoccupied, so a new name *Aëdes* (*Aëdimorphus*) *stokesi*, is proposed for this species, which is the one referred to by BAUER as *A. apicoannulatus*.

E. H.

MONTEIRO (J. Lemos). Sobre a transmissão do virus da febre amarella pelas fézes de persevejos infectados. [**Transmission of Yellow Fever by the Faeces of Infected Bed-Bugs.**]—*Brasil-Medico.* 1929. Aug. 31. Vol. 43. No. 35. pp. 1037–1040. With 5 text figs. [Butantan Inst., S. Paulo.]

The author allowed *Cimex lectularius* to bite infected *Macacus rhesus* during the febrile period ; for two to twelve days afterwards the bugs were kept in a tube ; the faeces emulsified were then injected subcutaneously into other rhesus and produced the clinical and post-mortem appearances of yellow fever. The inference is that a person bitten by Cimex might inoculate himself with yellow fever by scratching and rubbing-in infected faeces.

H. Harold Scott.

DINGER (J. E.), SCHÜFFNER (W. A. P.), SNIJDERS (E. P.) & SWELLENGREBEL (N. H.). Onderzoek over gele koorts in Nederland (tweede mededeeling). [**Yellow Fever Research in Holland. (Second Communication.)**]—*Nederl. Tijdschr. v. Geneesk.* 1929. Sept. 21. 73rd Year. 2nd Half. No. 38. pp. 4378–4383. With 3 charts in text. [5 refs.]

The danger of experimental yellow fever work is clearly demonstrated by the case of one of the authors, who suffered from an acute febrile disease without any characteristic clinical symptoms, but whose blood, injected on the 2nd and 3rd day of the disease into rhesus monkeys, caused in both cases a fatal attack of yellow fever with all the anatomopathological features of this disease. The disease could be transmitted from these monkeys to others by direct inoculation as well as by mosquito bites (*Aëdes aegypti*).

The patient recovered. He had probably been infected two days before the outbreak of the disease by the scratch of an infected monkey (which had an open wound at the time).

W. J. Bais.

DINGER (J. E.), SCHÜFFNER (W. A. P.), SNIJDERS (E. P.) & SWELLENGREBEL (N. H.). Onderzoek over gele koorts in Nederland (derde mededeeling). [**Yellow Fever Research in Holland. (Third Communication.)**]—*Nederl. Tijdschr. v. Geneesk.* 1929. Dec. 21. 73rd Year. 2nd Half. No. 51. pp. 5982–5991. With 1 plan & 2 figs. in text.

The further tests now applied have established the possibility of transmission of yellow fever by the *Aëdes aegypti* mosquitoes of Java. Experiments have been undertaken under very carefully controlled conditions in which infected mosquitoes and rhesus monkeys were the subjects of test. Laboratory-bred mosquitoes were fed upon infected monkeys. Those which were seen to have sucked blood were collected in a special cage in which a guineapig was fixed, on which the mosquitoes could feed. The infectivity of the monkey blood on which the mosquitoes had fed was definitely established. After the incubation period for the mosquitoes, called the "extrinsic incubation," and which experimentally appears to be about 18 days, they were fed in exactly the same careful way on healthy monkeys. In the first place tests on 23 monkeys with infective liver suspension and on 9 monkeys with infective blood gave a mortality of 17 and 9 respectively with an average of 5 days between infection and death. Nine monkeys were bitten by infected *Aëdes aegypti* from Java and of these 8 died after, on the average, 5 days. The same species of mosquito from Havana gave rise to 4 deaths out of 6 monkeys, in the average period of 6 days. The mosquitoes used in these tests had been infected 18, 25, 32, and 33 days previously. One monkey, bitten by a mosquito infected only 11 days previously, became sick but recovered, and another, bitten by 2 mosquitoes infected 105 days previously, remained perfectly well. The second of these monkeys showed no sign of immunity, for it succumbed to an inoculation of virulent liver suspension. Thus a demonstration is afforded that the Javan species can transmit yellow fever at least as well as the American species. Experiments with *Aëdes albopictus* gave very different results. Out of 10 rhesus monkeys variously bitten by albopictus mosquitoes, only one died of yellow fever. These two species of Aëdes are exceedingly common in the Dutch East Indies and the present experiments confirm the view that the introduction there of yellow fever is a possibility. Other experiments went to prove that the blood of a patient who had recovered from yellow fever had no effect on mosquitoes of an immunizing or a sterilizing character, nor was any inheritance of infectivity established for Javan *Aëdes aegypti*.

W. F. Harvey.

DINGER (J. E.). Experimentelle Untersuchungen ueber Gelbfieber. Nach gemeinschaftlichen Untersuchungen von J. E. Dinger, W. A. P. Schüffner, E. P. Snijders und N. H. Swellengrebel im Instituut voor Tropische Hygiene, Amsterdam. [**An Experimental Investigation of Yellow Fever. The Experiments of J. E. Dinger, W. A. P. Schüffner, E. P. Snijders and N. H. Swellengrebel at the Institute of Tropical Hygiene, Amsterdam.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 83–87 (167–171).

A general account of the results recorded in the two preceding papers.

E. H.

SNIJDERS (E. P.). Beitrag zur Klinik und pathologischen Anatomie des Gelbfiebers (nach Untersuchungen ueber Gelbfieber, von J. E. Dinger, W. A. P. Schüffner, E. P. Snijders und N. H. Swellengrebel mitgeteilt). **A Study of the Clinical and Pathological Anatomy of Yellow Fever.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 87–93 (171–177). With 3 text figs. [6 refs.]

A detailed account of a laboratory infection occurring in one of the investigators [see above, p. 485]. A monkey inoculated with 1 cc. of the patient's blood collected on the second day of fever died in five days of typical yellow fever. The disease was successfully transferred to other monkeys, and maintained by direct inoculation and also by means of *Aëdes aegypti.*

E. H.

DE VOGEL (W.). Les expériences de transmission de la fièvre jaune à l'Institut colonial d'Amsterdam. [**Experiments on the Transmission of Yellow Fever at the Colonial Institute, Amsterdam.**]—*Bull. Office Internat. d'Hyg. Publique.* 1930. Feb. Vol. 22. No. 2. pp. 282–286. With 1 diagram.

The government of the Dutch East Indies has made a law prohibiting any laboratory experiments with yellow fever in that territory. This step has been taken in order to avoid the possibility of the disease being accidentally introduced into the Dutch East Indies, where the natural carrier, *Aëdes aegypti*, is very abundant. On the other hand, the government is prepared to give every support to laboratory work in Europe, where there is no risk of this disease becoming established. The Rotterdam Lloyd Company has generously agreed to transport free of charge any laboratory material, such as mosquitoes or monkeys, from any oriental port to Marseilles.

Work on yellow fever has been conducted at the Colonial Institute, Amsterdam, using a French strain of the virus from Senegal. In addition to the results already published [see this *Bulletin*, Vol. 26, p. 1006] it is mentioned that experiments with *Stegomyia scutellaris* indicate that this very abundant species is capable of transmitting yellow fever by its bite. Although only non-fatal infections were thus produced in six rhesus monkeys, the blood of one of these animals collected two days after being bitten produced a fatal infection when inoculated into another monkey.

E. H.

SAWYER (W. A.), KITCHEN (S. F.), FROBISHER, Jr. (Martin) & LLOYD (Wray). **The Relationship of Yellow Fever of the Western Hemisphere to that of Africa and to Leptospiral Jaundice.**—*Jl. Experim. Med.* 1930. Mar. 1. Vol. 51. No. 3. pp. 493–517. [30 refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

The authors have studied three strains of yellow fever, two African and one Brazilian, with special reference to their serological relationships. Eleven monkeys immunized against an American virus survived inoculation with a highly virulent African strain of yellow fever, and only one showed any fever. The sera of 3 of these monkeys were collected and tested before the test inoculation. All 6 sera protected against death from an African strain, but 6 of the protected monkeys showed fever. Similarly 9 monkeys immunized against the African virus

showed no fever when inoculated with a Brazilian strain of the virus. The sera of 14 recovered human cases of yellow fever in Rio de Janeiro, were then tested for their protective value against the African virus and also against *L. icteroides* or *L. icterohaemorrhagiae*. Of these 14, the sera of 10 persons protected against African yellow fever virus, but not against leptospira ; the sera of 2 persons protected against leptospira, but not against African yellow fever virus ; and the sera of the remaining 2 persons protected against neither yellow fever virus nor leptospira. It is evident therefore that cases of spirochaetal jaundice (Weil's disease) had been present among those diagnosed as yellow fever in the recent epidemic in Brazil .

The serum taken from a patient 8½ years after an attack of yellow fever in Peru protected a monkey against the African virus. Serum 9 years after an attack in Salvador permitted the development of fever, but prevented death. Serum taken 30 years after an attack in Cuba did not protect.

Experiments with the sera of 6 patients recovered from the African strain showed that the sera all protected monkeys against American yellow fever virus. These observations support the generally accepted view as to the identity of the African and American strains of yellow fever, although marked differences were found in their virulence for monkeys. Out of 24 monkeys inoculated with infected blood of the African strain only one recovered ; whilst out of 20 inoculated with the Brazilian virus 15 showed fever and only two died.

E. H.

DAVIS (Nelson C.). **Susceptibility of Capuchin** (*Cebus*) **Monkeys to Yellow Fever Virus.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 321–334. [4 refs.] [Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The susceptibility of Cebus monkeys, possibly *Cebus variegatus*, *C. macrocephalus* and *C. flavus*, has been proved by experiments with 75 of these animals. The monkeys were infected both by the inoculation of blood containing the virus or by the bites of mosquitoes, and the disease was also transmitted from Cebus monkeys to Rhesus by means of mosquitoes. Recovered Cebus monkeys were found to be immune against reinfection, and their serum generally protected Rhesus monkeys against the disease. At least one animal died as a result of the infection and showed extensive necrosis of the liver.

[This paper is an extension of one published previously (see this *Bulletin*, Vol. 26, p. 1000). KUCZYNSKI and HOHENADEL (this *Bulletin*, ante, p. 86) also showed that Cebus monkeys were susceptible, and ARAGAO, the allied *Pseudocebus azarae*.]

E. H.

PETTIT (Auguste) & STEFANOPOULO (Georges). Réceptivité de divers singes pour le virus amaril. [**The Receptivity of Various Monkeys to Yellow Fever.**]—*C.R. Soc. Biol.* 1929. Nov. 22. Vol. 102. No. 31. pp. 561–563.

A summary of observations on the receptivity of monkeys to the virus of yellow fever. Two *Cercopithecus griseo-viridis*, 2 *C. callitrichus*, 2 *Papio sphinx* and 4 *Cynocephalus hamadryas* were inoculated intra-

peritoneally with large doses of infected liver, but showed no signs of any infection. Summarizing the observations, it seems that members of the genus *Macacus* (and especially *M. rhesus*) are particularly susceptible; certain Brazilian monkeys (*Chrysothrix sciurus*, *Cebus macrocephalus*) are slightly susceptible; whilst all African monkeys tested up to the present are completely refractory.

E. H.

PETTIT (Auguste) & STEFANOPOULO (Georges). Infections expérimentales inapparentes provoquées par le virus amaril chez les singes réceptifs. [**Experimental Inapparent Infections produced by Yellow Fever in Susceptible Monkeys.**]—*C.R. Soc. Biol.* 1929. Dec. 6. Vol. 102. No. 33. pp. 719–722.

Various authors have recorded that monkeys might die of yellow fever without showing any characteristic symptoms of the disease and the present article contains a record of two such infections. The first, a Cynomolgus monkey, was inoculated with infected liver and showed no rise in temperature during a week and seemed in good health, although a rhesus monkey inoculated with the same virus died in six days. On the third day after inoculation 5 cc. of blood was removed and inoculated into a normal monkey, which died 4 days later of typical yellow fever. On the 15th day the Cynomolgus monkey seemed ill, and, after collecting blood, was killed, but no signs of yellow fever could be found. Some of this blood of the 15th day was dried *in vacuo* and 16 days later inoculated into a rhesus monkey, which died of yellow fever 19 days after the inoculation. The second case, a rhesus monkey, was inoculated with virus and showed no rise in temperature for 8 days and no signs of illness until the 36th day, when it suddenly died with the typical pathology of yellow fever. Blood collected on the 30th day was mixed with virus and inoculated into a normal monkey, which died of yellow fever 5 days later, showing that the blood of the original monkey did not contain immune bodies against the virus. As the authors remark, it is necessary to be on the look-out for these inapparent infections in human beings and especially amongst the natives of endemic regions.

E. H.

HUDSON (N. Paul) & PHILIP (Cornelius B.). **Infectivity of Blood during the Course of Experimental Yellow Fever.**—*Jl. Experim. Med.* 1929. Nov. 1. Vol. 50. No. 5. pp. 583–599. With 5 charts in text. [8 refs.] [Internat. Health Division, Rockefeller Foundation, Lagos, Nigeria.]

Five rhesus monkeys were inoculated with yellow fever virus and batches of *Aëdes aegypti* fed daily on each monkey and specimens of blood injected into other animals. By mosquito transmission experiments the virus was found to be present in the peripheral blood of these five monkeys within one or two days after having been inoculated, which is also one or two days before the appearance of any febrile symptoms. In one instance mosquitoes became infected by feeding on the blood of a monkey inoculated only 12 hours previously. The blood of all five monkeys was found to be continuously infective during the febrile period and for one day afterwards, whether tested by

mosquitoes or by direct inoculation into other animals. Later the virus seemed to disappear from the blood.

In an interesting discussion of their results, the authors consider the course of experimental yellow fever in monkeys. For practical purposes fever was taken as 104° F. or more, occurring after the usual incubation period, and out of 606 monkeys that died of yellow fever, only 3·8 per cent. failed to reach this arbitrary limit, and of these 1 per cent. showed no registered rise. When death was delayed until the sixth, eighth and tenth days, the blood gave somewhat variable results in the last stages of the disease. In three out of the five monkeys, on the last day of infectivity, the inoculation of small quantities of their blood into normal monkeys produced fatal infections, whilst the inoculation of larger quantities of blood did not produce death. In one instance the blood collected before the final rise in temperature did not cause death, but on the two following days produced fatal infections, suggesting possibly a re-invasion of virus into the circulation.

With reference to treatment the authors point out that in monkeys killed on the first day of fever, tissue damage has already occurred, such as marked fatty degeneration of the liver and sometimes of the heart, and death of the liver cells. The results of the mosquito transmission experiments suggest that when insects are fed on monkeys at the height of the fever they become infective rather sooner than when fed on infected monkeys either before or after the febrile period. The animals inoculated with blood-virus showed a more rapidly fatal course of the disease than those infected by the bites of mosquitoes. The results of these experiments in general suggest that if the virus content of tissues corresponds with that of the blood, the optimum time for the preparation of vaccine is during the febrile period. If serum-virus is used for making vaccine, which, according to unpublished results of KLOTZ and HUDSON, has been found experimentally effective, blood drawn during fever is certainly preferable.

[KUCZYNSKI and HOHENADEL (see this *Bulletin*, Vol. 27, p. 86) previously showed that the virus appeared in the circulating blood of infected monkeys very soon after inoculation, and in one instance produced infection with the blood of a monkey collected only 8 minutes after it had been inoculated with infected blood. The fact that the blood of yellow fever patients is infective to mosquitoes before the appearance of any clinical symptoms is of considerable importance from the point of view of instituting methods of control during yellow fever outbreaks.]

E. H.

SELLARDS (Andrew Watson). **The Cultivation of Treponemata from the Blood of Normal Monkeys** (*Macacus rhesus*) **and from the Blood of Monkeys infected with Yellow Fever.**—*Proc. Nat. Acad. Sci.* 1930. Mar. Vol. 16. No. 3. pp. 222–228. [4 refs.] [Harvard Med. School, Boston.]

The author incubated the blood of 26 monkeys (*Macacus rhesus*) infected with a French strain of yellow fever, and in the blood of 9 monkeys obtained a fairly luxuriant growth of ordinary spirochaetes. Control cultures were made from 22 normal monkeys and in one instance a small spirochaete was isolated with a length of about 2 to 4 microns. The inoculation of this organism into monkeys produced

no reaction. [This organism seems to resemble "Vibrio macaci" found by KUCZYNSKI & HOHENADEL in cultures of organs from *Macacus rhesus*, see this *Bulletin*, Vol. 26, p. 296.]

The spirochaetes obtained from yellow fever monkeys showed marked variation in their morphology, some resembling those from normal animals. The most common forms were about 3 to 3½ microns in length with 2 to 2½ coils, and when cultivated at 37° C. frequently broke up into a mass of granules resembling some of the forms seen in mosquitoes. Some of the strains when inoculated into monkeys produced a rapidly fatal intoxication, with jaundice and gastric haemorrhages and a fatty liver. The livers did not show the widespread necrosis of yellow fever, but in some instances there was extensive fatty infiltration and in one case inclusion bodies were observed.

The most curious result is the apparent production of partial immunization by the inoculation of these cultures. Seven monkeys were inoculated with small doses, and five were subsequently infected and died of yellow fever and the remaining two succumbed to larger doses of the culture.

Subsequently the monkeys were first rendered immune to large doses of the cultures by means of repeated inoculations. Two monkeys thus treated were inoculated with a virulent strain of yellow fever and both survived, though one showed fever for one day; five controls all died.

Subsequently two other monkeys were immunized with a strain after passage through 13 subcultures, and subsequently inoculated with yellow fever virus. One died of yellow fever on the 30th day, whilst the other remained alive and well. One monkey was immunized against the spirochaete from normal monkeys as a control and another against a strain from a yellow fever one. Subsequently these animals were bled and 3 cc. of the serum of each mixed with virulent blood and inoculated into two normal monkeys. The one inoculated with virus and control serum died of yellow fever on the 5th day, whilst the other showed an abortive reaction and recovered.

The name "*Treponema xanthogenes*" is proposed for the organism, the nature of which requires much further investigation.

[It seems possible that these various strains of spirochaetes obtained by the author may have been derived from the alimentary canal, and the pathological conditions associated with yellow fever might quite easily favour their entry of the blood. Similar invasion of the blood by spirilliform organisms has been described by SANARELLI in the case of *Heliconema vincenti* in guineapigs [see this *Bulletin*, Vol. 24, p. 698; Vol. 25, p. 95]. The aetiological significance of "*Tr. xanthogenes*" is very difficult of interpretation, but the reviewer would draw attention to the fact that yellow fever virus withstands prolonged desiccation, whilst, so far as is known, all spirochaetes are immediately killed by drying.]

E. H.

SELLARDS (Andrew Watson). **Observations on Yellow Fever.**—*Southern Med. Jl.* 1930. Feb. Vol. 23. No. 2. pp. 121–124. [5 refs.] [Harvard Med. School, Boston.]

The author gives particulars of experiments with a Senegal strain of yellow fever [see this *Bulletin*, Vol. 25, p. 539]. The virus was found to be extremely virulent for monkeys and death might occur in 4 days

after inoculation, but more commonly in 5 to 7 days. In one instance a monkey died 26 days after injection.

Frozen blood was found to retain its virulence for very long periods, and in one instance 4 cc., that had been kept at about $-7°$ C. for six months, when inoculated intraperitoneally, killed a monkey in six days. Infected liver in one instance preserved its virulence for about 12 weeks at $-7°$C., after which the virulence diminished and monkeys injected after 16 and 20 weeks remained well. However, when subsequently injected with virus these animals developed fever, but recovered.

Necrosis of the liver was found to come late in the disease, for animals killed 24 to 36 hours before death was expected showed fatty infiltration and sometimes degeneration of the liver cells, but no necrosis.

Infected mosquitoes were carefully examined for Rickettsia and other organisms; but with negative results. In a small proportion masses of Rickettsia-like micro-organisms were found in the stomach, but not with the constancy and regularity that they are seen in lice and ticks infected with Rickettsia.

A monkey inoculated with the legs, containing coelomic fluid, of 7 infected mosquitoes was neither infected nor immunized, nor was a second monkey inoculated with coelomic fluid collected by means of a pipette from the thorax of 4 infected mosquitoes. As a control the tips of the abdomen were cut off these mosquitoes and inoculated into a monkey, which died of yellow fever.

In one experiment 2 mosquitoes of an infected lot produced a fatal infection, but another 8 mosquitoes of the same lot, when fed on an immune monkey, failed to produce infection when fed on a normal monkey seven days later. [DINGER and his colleagues obtained the opposite results, see this *Bulletin*, Vol. 26, p. 1006.]

The virus was found to be capable of living in guineapigs. One guineapig was inoculated with 4 cc. of brain emulsion from a yellow fever monkey ; one week later its spleen together with some blood was noculated into a second guineapig ; after 5 days a similar injectioni was made from the second to a third guineapig. All the animals remained well, showed no rise in temperature and showed no lesions at autopsy. Five days after being inoculated the blood and spleen of the third guineapig were injected into a monkey which died of yellow fever in less than 3 days. A repetition of the experiment gave negative results. In another experiment 2 guineapigs were inoculated with the same dose of virus (3·5 cc. of infected blood) and a week later half of the spleen and 4 cc. of blood from each of these animals inoculated into 2 monkeys. One showed a typical attack of yellow fever, whilst the other remained well and susceptible.

The fluid from the anterior chamber of the eye and also the cerebrospinal fluid of infected monkeys were found to contain the virus, and produce fatal infections when inoculated into normal monkeys.

E. H.

DA CUNHA (Aristides Marques) & MUNIZ (Julio). **Note about Experimental Yellow Fever.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1929. Jan. & Feb. No. 5. pp. 17–18.

The authors give some observations on the course of yellow fever in monkeys. They used a Brazilian strain isolated by them and also an African strain [presumably the " Asibi " strain]. The African strain

was found to be invariably fatal to monkeys 4 to 6 days after inoculation, but the Brazilian strain gave varying results, sometimes causing the rapid death of the animal, at others producing chronic infections with death after intervals ranging in one instance up to 36 days, and finally in some monkeys producing no signs of the disease.

The livers of monkeys infected with the Brazilian virus showed considerable variations in the extent of the necrotic lesions. In some there was extensive necrosis with destruction of the greater part of the hepatic cells; others showed no necrosis but only intranuclear changes; whilst in one monkey no histo-pathological changes could be found, although the animal was proved to contain yellow fever virus. On the other hand, monkeys infected with the African strain were always found to show extensive lesions in the liver.

E. H.

MONTEIRO (J. Lemos). Notas e observações sobre a febre amarella experimental. Communicação feita á 4a conferencia sul-americana de microbiologia, pathologia e hygiene. [**Notes on Experimental Yellow Fever.**]—*Archivos de Hyg.* Rio de Janeiro. 1929. Sept. Vol. 3. No. 2. pp. 141–150. With 6 figs. on 3 plates. English summary facing p. 150. [Butantan Inst., São Paulo.]

Virus of the African (Asibi) strain after infecting a *M. rhesus* was treated with formol and phenol and kept in the ice-chest for six days. When injected into other *rhesus* death resulted without any preceding febrile reaction. An emulsion of the liver of this animal when injected into another *rhesus* caused death after fever, and the signs of yellow fever post-mortem were typical. The first virus was clearly attenuated in that it set up an afebrile infection.

Another mode of preparing a vaccine is detailed. The liver and spleen are taken and placed in 5 per cent. phenol for 15 minutes, then washed at least twice in normal saline, cut into small pieces and triturated with sand. Five times the weight of normal saline is added and an emulsion made, filtered through four layers of gauze and placed in a flask with addition of 1 per cent. chloroform; it is well shaken for two hours and then placed overnight in an ice-chest; the following day it is again shaken, filtered, and distributed in 2 cc. ampoules. Tests with this are not yet completed.

H. Harold Scott.

FROBISHER, Jr. (Martin). **Properties of Yellow Fever Virus.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 300–320. [30 refs.]

The authors used four strains of yellow fever, two African and two Brazilian, for the study of the properties of the virus. Cultures were made on various media and 13 strains of bacteria isolated from the blood or liver of infected monkeys. Attempts to find *Leptospira icteroides* both by culture and inoculation into guineapigs were negative. Out of 15 guineapigs inoculated with infected human blood, 8 showed rises in temperature, but cultures and also subinoculations into other guineapigs and a monkey gave negative results. [It is possible that these animals may have been infected with yellow fever.]

An attempt to adsorb the virus by *Bacillus cereus* gave negative results. The action of various disinfectants showed that the virus was not inactivated by exposure at 30° C. for 30 minutes to the following substances, which would ordinarily prove bactericidal under these conditions: Mercuric chloride, 1 in 7,500; phenol, 1 in 150; hexyl-

resorcinol, 1 in 1,500; sodium oleate, 1 in 150. The virus was inactivated though not necessarily killed by similar exposure to the following: Eosin (yellowish), 1 in 300; ethyl alcohol, 1 in 6; formalin, 1 in 15; sodium oleate, 1 in 50; liquor cresolis compositus, 1 in 200. Serum virus was completely inactivated when heated at 60° C. for 10 minutes; but heating at 55° C. for a similar period may or may not inactivate the virus. Temperatures below 55° C. for 10 minutes cannot be relied upon to have any effect. Dried blood virus heated at 60° C. for 10 minutes produced yellow fever in a monkey after an incubation period of 17 days and the animal died after 22 days. A monkey was injected repeatedly with a total of 153 cc. of infected serum inactivated by heating at 60° C. for 20 minutes. Although the serum of this monkey failed to protect other monkeys against the disease, the animal itself resisted a fatal dose of highly infectious serum. Experiments to determine the electrical charge were inconclusive. No satisfactory precipitin reactions could be found between yellow fever sera and various antigens, such as urine from infected monkeys, alcoholic extracts of the livers and hearts of infected monkeys, and an aqueous extract of infected liver. Seven strains of proteus bacilli were tested in the effort to find a non-specific agglutination phenomenon, but yellow fever immune sera failed to agglutinate any of these organisms. Moreover, no significant skin reactions could be demonstrated by the intracutaneous injection of various yellow fever sera, tissue extract, and fresh virus blood, into sick, recovered and normal monkeys.

E. H.

SAWYER (W. A.) & FROBISHER, Jr. (Martin). **The Filtrability of Yellow Fever Virus as existing in the Mosquito.**—*Jl. Experim. Med.* 1929. Dec. 1. Vol. 50. No. 6. pp. 713–718. [5 refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

It may be recalled that STOKES, BAUER & HUDSON [see this *Bulletin*, Vol. 25, p. 537] found that the yellow fever virus in the mosquito suspended in salt solution would not pass through Berkefeld filters V and N. The present authors confirm this observation, but have made the interesting discovery that if the infected mosquitoes are ground up with monkey serum diluted with half its volume of normal saline solution, the virus will then pass through these filters. The same results were obtained with mosquitoes ground up during the so-called incubation period, from which it is evident that the virus of yellow fever as it exists in the mosquito behaves with regard to filtration through Berkefeld N filters in the same way as the virus in the blood of infected monkeys.

E. H.

GOMES (Luiz Salles). Pesquizas em torno de alguns casos de febre amarella. These apresentada á 4a conferencia sul-americana de microbiologia, pathologia e hygiene—Julho de 1929. [**Research on a Series of Cases of Yellow Fever.**]—*Archivos de Hyg.* Rio de Janeiro. 1929. Sept. Vol. 3. No. 2. pp. 151–165. [8 refs.] English summary facing p. 164. Also in *Ann. Paulist. Med. e Cirurg.* 1930. Jan. Vol. 21. No. 1. pp. 6–16. [8 refs.]

Two of the three researches spoken of in this paper have already been mentioned in the *Bulletin*. The first was to prove once again

the absence of *Leptospira icteroides*, a fact now generally taken for granted. The second confirmed the "Costa Cruz reaction," the reduction of complement in serum of yellow fever patients. This, even in mild cases, is much reduced and in fatal cases is absent altogether. The third was a determination of blood-sugar by the method of Folin and Wu. In a convalescent patient the amount was 0·0670 gm. per cent., in others at different stages of the disease it was lessened, on the second to third day to 0·046, on the fourth 0·009 to 0·002, on the sixth to 0·008 gm. per cent. In general terms there is a distinct hypoglycaemia from the fourth to seventh days of disease.

H. Harold Scott.

ARAGÃO (Henrique de Beaurepaire). Modernas acquisições sobre a febre amarella experimental. [**Modern Achievements in Experimental Yellow Fever.**]—*Archivos de Hyg.* Rio de Janeiro. 1929. Sept. Vol. 3. No. 2. pp. 5–22. [34 refs.] English summary facing p. 22. [Oswaldo Cruz Inst., Rio de Janeiro.]

This article is a summary of the work which has been recorded on the subject of yellow fever during the past two years: the species of monkeys susceptible, the mosquitoes capable of acting as vectors, the search for a causative organism, attempts to devise a sure serological means of diagnosis and the manufacture of a protective vaccine. All these have already received notice in the *Bulletin*. The author gives some more details of vaccine prepared from the organs with formalin and phenol. It has been used for 25,000 persons, susceptible new arrivals chiefly. Among these about one per 1,000 has later become infected, and it is inferred that the dose employed was too small. Consequently of late the vaccine has been concentrated and the dose increased, but it is too early to express an opinion on this at present.

H. Harold Scott.

PARREIRAS (Decio). Algumas observações sobre a vaccina anti-amarillica de Aragão. [**Remarks on Aragão's Yellow Fever Vaccine.**]—*Sciencia Med.* 1929. Aug. Vol. 7. No. 8. pp. 395–397.

ARAGÃO's modification of Hindle's vaccine, an emulsion in formol and carbolic solution of the liver, spleen, kidneys and brain of an infected *M. rhesus*, was tried in Nilopolis and other places in Brazil. A dose of 2 cc. was injected subcutaneously in 182 subjects. Two only of them contracted the disease within 45 and 180 days of vaccination; both were severe infections and one patient died.

H. Harold Scott.

HINDLE (Edward). **The Duration of Yellow Fever Immunity.**—*Lancet.* 1930. Mar. 1. p. 451. [2 refs.] [Wellcome Bureau of Scient. Research, London.]

In order to test the duration of immunity against yellow fever, the blood of a patient who suffered from a severe attack of the disease in Brazil more than 24 years previously was collected, mixed with virus and inoculated into monkeys. One rhesus monkey received a mixture

of 4 cc. of citrated blood of the patient, 0·05 gm. of infected liver and 0·5 cc. of blood from another infected monkey collected on the second day of the fever. A second rhesus monkey was inoculated with 1 cc. of the patient's blood and 0·05 gm. of infected liver. Neither of these monkeys showed any rise in temperature nor other signs of the disease, whilst a control animal inoculated with the infected liver used in the experiment died in 4½ days. The liver came from a monkey infected with an African strain, whilst the infected blood contained a Brazilian strain of the virus; therefore the results furnish additional evidence in support of the identity of the West African and Brazilian strains of the disease.

These results confirm the generally accepted view that recovery from yellow fever is followed by a lasting immunity, for in this case the patient had never been exposed to infection since his attack in 1905, yet his blood was still capable of producing passive immunity in monkeys.

E. H.

MONTEIRO (Lemos). Contribuição ao estudo da flora microbiana na febre amarella e suas relações immunologicas com a infecção humana e experimental—sobre a possibilidade de um diagnostico bacteriologico da febre amarella. Communicação feita á 4a conferencia sul-americana de microbiologia, pathologia e hygiene. [**Contribution to the Study of the Bacterial Flora in Yellow Fever and the Immunological Reactions in Human and Experimental Infections — regarding the Possibility of a Bacteriologic Diagnosis of Yellow Fever.**]—*Archivos de Hyg.* Rio de Janeiro. 1929. Sept. Vol. 3. No. 2. pp. 197–242. With 2 plates. English summary facing p. 243.

The author isolated various organisms from the tissues of patients dead of yellow fever and from those of animals experimentally infected. These were notably Corynebacteria, the chief of which is designated FH4. Though not regarded as causative this was agglutinated by the sera of patients up to a titre of 1 : 160, if the culture is fresh, and it is suggested that this reaction may be of service in diagnosis on lines similar to that of *Proteus X*19 in typhus.

H. Harold Scott.

BOYÉ. La fièvre jaune en Afrique Occidentale Française au cours de l'année 1928. [**Yellow Fever in French West Africa during the Year 1928.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. Feb. Vol. 22. No. 2. pp. 280–281.

During 1928 only 6 cases of the disease were recorded from the French colonies, 3 isolated cases in the Ivory Coast and another 3 isolated cases in Dahomey. All except one were fatal.

E. H.

BUCHANAN (George S.). La fièvre jaune dans l'Afrique Occidentale Anglaise. [**Yellow Fever in British West Africa.**]—*Bull. Office Internat. d' Hyg. Publique.* 1930. Feb. Vol. 22. No. 2. pp. 277–279. [2 refs.]

During the year 1929 only 5 cases of yellow fever, of which 3 were fatal, have been recorded from British West Africa. These all occurred at Bathurst in the Gambia.

E. H.

SELWYN-CLARKE (P. S.). **Report on the Yellow Fever Conference at Dakar, 1928. No. VII of 1929-30. Gold Coast.**—38 pp. With 9 plates. 1929. Govt. Printing Office, Accra, and Crown Agents for the Colonies, 4 Millbank, S.W.1. [2s.]

An account of the yellow fever conference at Dakar, 1928, the report of which has already been reviewed in this *Bulletin*, Vol. 26, p. 602. Incidentally, the writer mentions that Dr. MATHIS reported having found *Leptospira icterohaemorrhagiae* in the rodents at Dakar, which seems to be the first time it has been recorded from West Africa, although previously BLANCHARD, LEFROU & LAIGRET [see this *Bulletin*, Vol. 20, p. 582] found an organism closely resembling this spirochaete in patients suffering from febrile jaundice in the French Congo.

E. H.

SEIDELIN (Harald). **Yellow Fever.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Aug. 26. Vol. 23. No. 2. p. 211.

HINDLE (Edward). **Yellow Fever.** [Correspondence.]—*Ibid.* Nov. 25. No. 3. pp. 321–322. [4 refs.]

The first letter calls attention to the fact that several dogmatic statements on yellow fever problems had been made on insufficient evidence. In particular, the belief that the virus is present in the blood of patients during the first three days only of the disease, seems to have little foundation and the writer asks for further information on this question.

In the reply, a brief summary is given of recent experiments supporting the earlier view that, as far as human patients are concerned, the virus generally disappears from the blood within three days of the onset of fever, and therefore when any attempt is being made to infect monkey from cases of yellow fever, the blood should be collected as soon as possible after the beginning of fever, preferably on the first day. This does not necessarily imply that the blood is infective for only three days, as the virus may be present in the circulation before any signs of the disease can be detected. As a result of the early disappearance of virus there seems to be little danger of acquiring the infection when performing autopsies on human yellow fever cases, and up to the present there is no record of the disease having been acquired in this manner. On the other hand, since the discovery of the susceptibility of monkeys, in which the virus is present at death, there have been at least ten cases of laboratory infection, which is a sufficient indication of the highly infectious nature of the virus.

E. H.

ROUBAUD (E.). Recherches biologiques sur le moustique de la fièvre jaune, *Aedes argenteus* Poiret. Facteurs d'inertie et influences réactivantes du développement. Les oeufs durables et leur importance dans le rajeunissement du cycle évolutif. [**Biological Studies on the Yellow Fever Mosquito. Factors of Inertia and Reactivating Effects on Development. Resistant Eggs and their Importance in restarting the Development Cycle.**]—*Ann. Inst. Pasteur.* 1929. Sept. Vol. 43. No. 9. pp. 1093–1209. With 21 text figs. [33 refs.]

It is impossible in the space available to do justice to the extensive series of observations contained in this memoir, which in addition to its

general biological interest, also contains much valuable information on the bionomics of this important mosquito.

The first part is devoted to an account of the peculiarities of egg laying and their subsequent hatching. The female seems to be guided by certain tropisms in choosing a site for laying her eggs and invariably selects water containing decomposing material in preference to pure water. Floating wood is often selected, if its surface is decomposing, in which case the eggs are laid on the wood instead of on the surface of the water. The eggs laid, although morphologically identical, are of two kinds, one *active* which hatch in two or three days, whilst the other kind are *inactive* and remain dormant for considerable periods. Out of three females carefully examined, the eggs laid by the first contained 60 per cent. active eggs ; the second, 70 per cent. active ; whilst the third laid only inactive eggs. By means of mechanical stimulation, such as shaking, it is possible to make both kinds of eggs hatch rapidly, but some of the inactive eggs may require yet further stimulation. Consequently there is no sharp distinction between the two types of eggs, but rather a gradation from those hatching readily to those requiring a very long period of quiescence, or repeated artificial stimulation. In the absence of such stimulation these inactive eggs may remain alive without any obvious development for many months up to a maximum of just over a year, but six to eight months is an average duration. They will also live dried on filter paper for three or four months, a useful property in sending them by post. Many physical and chemical excitants will cause these dormant eggs to hatch. In general, prolonged exposure to cold or prolonged drying render the eggs ready to hatch, but short exposures have comparatively little effect. This, of course, corresponds with the conditions met with in nature, when these eggs help the insect to survive through periods of drought or cold.

A large number of chemicals have been tested in the past, and the author only gives the results of tests with ether, various oxidizing agents such as potassium permanganate, and sodium hypochlorite. These three were all found to produce hatching, but the latter is said to be preferable to any other substance for revealing the presence of living larvae. The eggs to be tested are placed in 1 per 1,000 sodium hypochlorite, and if any contain larvae they will generally be found to hatch within 24 hours. It must be noted that the larvae after hatching are killed by the fluid, so it can only be used as a test. Finally these eggs hatch in the presence of ferments, such as diastases, secreted by micro-organisms in water containing decomposing matter. Pepsin, trypsin, and papaine were all found to be as effective as cultures of micro-organisms.

A study of the females showed that some lay their eggs after only one feed of blood, whilst others require two, three or four meals before laying. The differences in egg laying are correlated with metabolic differences in the females. When the larval development is very slow the resulting females are generally of the sluggish type, possibly as a result of toxic conditions in the medium. When the larvae are very crowded there is a considerable slowing of development as a result of the effects of toxic substances produced in the water. When larvae are exposed to the action of such water, even in small numbers, a secondary diapause, or stoppage in development, is produced, accompanied by a diminution in the number of females produced and eventually by their suppression. This effect was also produced by adding ammonium carbonate in the proportion of 1 : 10,000 to the water containing larvae.

When females have developed at temperatures below 20° C. they do not show these physiological defects. On the contrary, some females kept at 25–30° C. ceased laying, but when exposed to 16–18° C. for 10 days recovered their fecundity.

Causes of the production of resistant eggs are next discussed, and the conclusion reached that these are eggs containing an excess of toxic material derived from the parent. These toxic substances cause a stoppage in the post-embryonic development, or *asthenobiosis* of the first larval stage. In addition to the diapause thus produced at this stage of development by inherited effects, a secondary diapause may appear during later larval stages as a result of unfavourable external conditions.

The metagonic reactivation of the resistant eggs is next considered and the various methods of producing the hatching of larvae discussed in detail. Finally, the author discusses the practical bearing of these results and the great importance of these resistant eggs, as they enable the mosquito to withstand ordinary anti-larval measures. In order to ensure the hatching of these eggs, it is recommended that commercial sodium hypochlorite solution containing 90 gm. of chlorine per litre should be added to the water in the proportion of 1 part per 1,000. This should be done during the dry season when fewer breeding places have to be dealt with. The presence of such eggs, however, shows that the systematic treatment of breeding places has to be carried out with very great care in order to ensure the destruction of all development stages of the mosquito.

E. H.

SAUTET (Jacques). A propos de l'emploi des hypochlorites dans la lutte contre la fièvre jaune. [**Concerning the Use of Hypochlorites in the Fight against Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 202–204. [2 refs.]

An account of experiments on the use of hypochlorites for the destruction of yellow fever mosquitoes [see above.] When Eau de Javel* was added to distilled water containing eggs of Aëdes, it was found to have a very unfavourable action so long as the temperature did not exceed 25° C. ; at 37° C. the larvae hatched almost at once and then died. In contaminated water, on the other hand, the Eau de Javel, although having an unfavourable action at low temperatures, at 25° C. allowed the development of the larvae to proceed in the same way as in ordinary water. At 37° C. the hatching of the eggs was instantaneous in the chlorinated water, but did not occur in pure water. The author is of the opinion therefore that for destroying mosquito larvae hypochlorites are of no use in tropical countries as they merely stimulate the development of the eggs ; and in temperate countries their use is unnecessary.

E. H.

DE OLIVEIRA (Waldomiro). Prophylaxia da febre amarella no estado de São Paulo, Brasil—Julho de 1929. [**Yellow Fever Control in the State of São Paulo, Brazil**]—*Archivos de Hyg.* Rio de Janeiro. 1929. Sept. Vol. 3. No. 2. pp. 37–117. With 5 plates (2 maps) & 8 charts. English summary facing p. 116.

The first case of the recent outbreak of yellow fever seen in São Paulo occurred early in 1928 and measures were immediately

* Solution of chlorinated potash or soda.

adopted to deal with it. The districts were divided into sectors and careful inspection made to discover any foci of Aëdes. These were then promptly dealt with. Places where cases occurred were visited, but segregation of suspects was not carried out, as this measure would be of little value in the absence of any certain means of early diagnosis. Public lectures and demonstrations with cinema films were given. The Port of Santos has thus been kept free from the disease and São Paulo has consequently not suffered.

H. Harold Scott.

Ichok (G.). Les problèmes actuels de la fièvre jaune. [**The Present Problems of Yellow Fever.**]—*Rev. d' Hyg. et de Méd. Préventive.* 1929. Dec. Vol. 51. No. 12. pp. 918–931.

A general account with special reference to prophylaxis of the conclusions of the yellow fever conference held at Dakar in April, 1928.

E. H.

Regis (L. J.). La fièvre jaune. Etat actuel de la question. [**Yellow Fever. The Present State of the Problem.**]—*Marseille Méd.* 1929. Sept. 15. Vol. 66. No. 26. pp. 313–341.

A surprisingly erroneous compilation apparently written under the impression that Noguchi's "*Leptospira icteroides*" is the causative organism of yellow fever.

E. H.

Le Gac (P.). L'excitation amarile. [**Yellow Fever Excitation.**]—*Bull. Soc. Path. Exot.* 1929. Oct. 9. Vol. 22. No. 8. pp. 743–746.

Calls attention to the extreme nervous symptoms that may be shown by yellow fever patients, which in some cases may be so severe as to be mistaken for delirium tremens or other forms of delirium.

E. H.

TROPICAL OPHTHALMOLOGY:

A REVIEW OF RECENT ARTICLES.—XIII.*

EYELIDS.—WRIGHT[1] has drawn attention to the value of Webster's operation for entropion and trichiasis (*vide* MACRAE, *British Journal of Ophthalmology*, 1928. Vol. 12. p. 25). In this operation an incision is made through the entire thickness of the tarsal plate on the conjunctival surface of the lid; the wound is placed at a distance of 3 mm. from the border of the lid and is parallel to it. The tarsal plate is completely divided into an upper and a lower portion. The incision approaches either extremity of the lid margin, but does not quite reach it. A strip of mucous membrane, taken from the lip, is then grafted into the wound. Before the graft is placed in position all fat is removed from its deep surface and its extremities are shaped so that the strip of tissue lies properly in place. No sutures are required.

CONJUNCTIVA.—CHESNEAU[2] has investigated the forms of infectious conjunctivitis met with in Cammon. 41 per cent. of the infections were due to the Morax Axenfeld bacillus, 29 per cent. to the Koch-Weeks, and the two infections were associated in 11 per cent. Pfeiffer's bacillus was met with in 6 per cent., the pneumococcus in 3 per cent. and the gonococcus in only 2 per cent. The Koch-Weeks inflammation is usually of a mild type, and the hot season exercises a marked influence upon the occurrence of epidemics of this disease and of diplobacillary conjunctivitis. The author describes three cases of conjunctivitis accompanied by chemosis, miosis and haemorrhage beneath the bulbar conjunctiva. He attributed these attacks to the presence of ascarides and suggests that this parasite can cause a definite conjunctival inflammation.

Trachoma.—WARNER[3] describes the prevalence of trachoma amongst the Indians in Arizona and in New Mexico. He thinks there is a considerable basis for a belief that the disease was introduced into the country by the early Spanish settlers. In 1912 as many as 39 per cent. of Indians were found to be infected in some districts. The active work of the Medical Service amongst the Indians has now resulted in a marked reduction in the incidence of the disease. He recommends that the practice of segregation of trachomatous children into special schools should be extended to include all the Indian country, and that the main effort against trachoma should be concentrated on the treatment of the infected children in these schools.

GUBBAY[4] states that the majority of the patients attending the Indian clinic at Jammu, Kashmir, are suffering from trachoma or

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* For the twelfth of this series see Vol. 27, pp. 22–30.

[1] WRIGHT (R. E.). Webster's Operation for Entropion of the Upper Lid.—*Indian Med. Gaz.* 1929. Oct. Vol. 64. No. 10. pp. 549–550.

[2] CHESNEAU (Pierre). Les conjonctivites infectieuses au Cammon (province du Moyen-Laos).—*Ann. de Méd. et de Pharm. Colon.* 1929. July–Aug.–Sept. Vol. 27. No. 3. pp. 416–422.

[3] WARNER (H. J.). Notes on the Results of Trachoma Work by the Indian Service in Arizona and New Mexico.—*Public Health Rep.* 1929. Nov. 29. Vol. 44. No. 48. pp. 2913–2920. [9 refs.]

[4] GUBBAY (R.). Chaulmoogra Oil in the Treatment of Trachoma.—*Indian Med. Gaz.* 1929. Oct. Vol. 64. No. 10. p. 563.

granular lids. He has found the application of chaulmoogra oil extremely satisfactory, and he now uses it almost to the exclusion of other remedies. The application may be made daily or on every alternate day if there is excessive irritation. About ten to fifteen applications are said to be sufficient. As might be expected, early cases are the most satisfactory to treat.

McHenry[5] has discussed the treatment of trachoma, and he stresses the importance of ensuring that the caruncle is free from infection. He uses as a routine a combination of grattage and expression, and first treats the bulbar conjunctiva, semilunar fold and caruncle. Anaesthesia is secured by cocainization and the injection of a 1 per cent. procaine hydrochloride solution beneath the bulbar conjunctiva, under the semilunar fold, and into the substance of the caruncle. Each individual trachoma follicle is punctured with a sharp Graefe knife and the contents then expressed with a small Prince forceps. The caruncle is pulled up between the blades of the forceps by gripping with an iris forceps. The conjunctiva of the lower lid is then treated in a similar fashion and is scrubbed with a toothbrush soaked in 1 : 1,000 mercuric chloride solution. The lining of the upper lid and fornix is then carefully treated in the same way. After an interval of ten or fifteen minutes, mercuric chloride, 1:500, is rubbed carefully and thoroughly into the lids with wool wound on a wooden applicator, the caruncle and bulbar conjunctiva being included. The sac is irrigated with sterile water or boric solution and filled with a 2 per cent. iodoform ointment. Blepharophimosis requires attention in most chronic cases, and a canthoplasty should precede other operative measures.

Tramini[6] describes the benefit which followed the establishment of a small eye dispensary at El Kantara, on the borders of the Sahara. The dispensary only contains three rooms and a few simple instruments. In 1926, 2,389 patients were treated, 1,788 being trachomatous.

Cassimatis[7] has drawn attention to the value of jequirity in the treatment of trachomatous pannus. The treatment was introduced by De Wecker in 1882 as a systematic measure. The intense reaction produced by it sometimes caused a destructive ulceration of the cornea. It is now possible to employ a product called jequiritol, which has a known strength. Four grades are used ; the first two produce only a feeble reaction, but the third and fourth cause an acute and very marked inflammation. If the inflammation becomes excessive it can be controlled by an anti-jequirity serum. Cassimatis found the mild grades of jequiritol effective in treating the small relapsing corneal ulcers which are common in the late stages of trachoma and other conjunctival diseases.

Salvati[8] has been much impressed by the beneficial action of tracolysin in the treatment of trachoma. This drug is a combination of

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5 McHenry (D. D.). Practical Points in the Treatment of Trachoma.—*Jl. Amer. Med. Assoc.* 1929. Oct. 26. Vol. 93. No. 17. pp. 1291–1295. With 2 text figs. [7 refs.]

6 Tramini (J.). Le fonctionnement du dispensaire antiophtalmique d'El Kantara en 1925, 1926 et 1927.—*Arch. Inst. Pasteur d'Algérie.* 1928. Dec. Vol. 6. No. 4. pp. 496–500. With 1 text fig. [1 ref.]

7 Cassimatis (C.). Le jéquiritol dans le traitement du trachome et ses complications pannus et keratite recidivante.—*Jl. Egyptian Med. Assoc.* 1929. Oct. Vol. 12. No. 8. pp. 142–148.

8 Salvati. Le traitement du trachome et ses complications par la tracolisine.—*Jl. Egyptian Med. Assoc.* 1929. Oct. Vol. 12. No. 8. pp. 155–158.

glycerophosphate and nucleinate of soda with some phenol. Half a cc. is injected beneath the conjunctival cul de sac. He has found that trachomatous follicles undergo absorption and the corneal complications soon disappear under the treatment. A maximum of thirty injections may be required.

The *Revue Internationale de Trachome* for October, 1929, contains an enthusiastic recommendation by A. MONBRUN[9] of diathermy as a means of treating trachoma and its complications. He employs sterilized sewing needles for the application of the current and is particularly careful to avoid any prolonged application and always to bear in mind the fact that subsequent necrosis extends beyond the area of blanching. The treatment must not be used in the presence of secondary infections.

SÉDAN[10] recognizes that the subconjunctival injection of strong solutions of cyanide of mercury in the treatment of persistent pannus may prove objectionable ; but he has found weaker solutions of the drug to be more useful. He employs a strength of 1 in 5,000 combined with acoin. A very fine needle is used and two points of entry are made, one at each extremity of the horizontal meridian of the cornea. A circumlimbic injection, involving half the circumference of the cornea, is made during the withdrawal of the needle.

COLLIN[11] reports a case of recurrent conjunctival inflammation which occurred in a girl aged seventeen. The author considers it to have been true trachoma, although no source of infection could be traced. It is noteworthy that the patient was subject to a general lymphatism and had never menstruated.

CORNEA.—*Keratomalacia.*—VISWALINGAM and MARTIN[12] have made some observations regarding keratomalacia as it occurs in the Malay States. The patients usually belong to the Indian community. Night blindness is met with amongst adults, whilst keratomalacia is more often seen in children. Inunctions of gingelly oil were found useful, in addition to a diet of fresh milk, eggs, fruit and cod-liver oil. Martin found the calcium content of the blood to be lowered. Milk and liver extract appeared to raise this.

One often still sees it stated that keratomalacia does not occur in adults. Surgeons who have experience of the disease know, of course, that this is erroneous. KIRWAN[13] has reported six cases of the disease which he met with in patients whose ages varied from twelve years to forty-five years. The diet deficiency in some of these patients had caused a urethral discharge which resembled gonorrhoea.

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9 MONBRUN (A.). Le trachome et la diathermie chirurgicale. Méthodes, techniques et instrumentation pour la destruction des granulations conjonctivales, du pannus trachomateux et des follicules des cils trichiasiques. —*Rev. Internat. du Trachome.* 1929. Oct. Vol. 6. No. 4. pp. 145–164. [2 refs.]

10 SÉDAN (Jean). Sur le traitement des pannus rebelles injections sous-conjonctivales de cyanure de mercure.—*Rev. Internat. du Trachome.* 1929. Oct. Vol. 6. No. 4. pp. 165–169.

11 COLLIN (L.). Un cas de trachome autochtone.—*Rev. Internat. du Trachome.* 1929. Oct. Vol. 6. No. 4. pp. 185–186.

12 MARTIN (P. H.). Observations on Cases of Keratomalacia.—*Malayan Med. Jl.* 1929. Sept. Vol. 4. No. 3. pp. 103–104. [1 ref.]

13 KIRWAN (E. W. O'G.). Keratomalacia in Adults.—Reported in *Brit. Med. Jl.* 1930. Mar. 1. pp. 389–390.

PILLAT[14] (Arnold) also reports six cases of the disease which occurred in adults. He stresses the fact that the condition is primarily a "systemic disease which affects the greater part of the ectodermal structures—skin and its glands, hair, nails, and the epithelium of the respiratory and digestive tracks."

Cataract.—A paper by ELLIOT[15] on cataract extraction, though it relates primarily to European patients, contains many most valuable hints to those engaged in tropical practice. Regarding the question of maturity and of the time at which operation should be recommended, the author states "no patient should be allowed to go blind and to drop his normal activities. With modern methods of operating, any lens can be safely removed, however immature the cataract that darkens its vision. . . . When a patient reaches the stage in which he can no longer get about comfortably, or in which he cannot read, write, and carry on his usual occupations with moderate comfort, or cannot do either of these things, he should be operated on without delay." Perfect asepsis is, of course, essential when operating on an immature cataract. Elliot prefers to perform a preliminary iridectomy and to follow this a month later by extraction beneath a bridge flap of conjunctiva. [This technique is naturally less suitable in tropical practice. But after a little experience, it is quite easy to combine the operations and to perform an iridectomy beneath a conjunctival bridge if the flap is placed slightly to one side.] Glycosuria, provided the urine is free from acetone and diacetic acid, does not contraindicate operation. Leper patients usually do surprisingly well.

The "squeezing patient" is the bugbear of ophthalmic surgeons in general, but those who work amongst the more unsophisticated races are specially liable to encounter such difficult patients. Various measures from time to time have been devised to bring about a temporary loss of power of the orbicularis, the muscle whose violent contraction is the most pernicious, and thus to render an intraocular operation safer. O'BRIEN[16] has found it quite a simple matter to induce a paresis of the temporo-facial division of the seventh cranial nerve by injecting 2 per cent. procaine hydrochloride solution into the tissues which surround the branch of the nerve as it crosses the condyle of the mandible. The point for injection is selected as follows: "The zygoma is located and the underside is followed backwards to a point just in front of and slightly below the external auditory meatus. The patient is then asked to open his mouth, and as he does this the condyle of the mandible is felt to slide forward. When the mouth is open, one notes a distinct depression under the finger tip. As the mouth is closed, the condyle is felt to slip back, and it is directly over this point and down on to it that the solution is to be injected." The needle should be pushed in until it strikes the bone. About 1 cc. of the anaesthetic solution is then injected and an additional 1 cc. is injected into the tissues during the withdrawal of the needle. Paresis is complete within five minutes.

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[14] PILLAT (Arnold). Does Keratomalacia exist in Adults?—*Arch. of Ophthalm.* 1929. Sept. & Oct. Vol. 2. Nos. 3 & 4. pp. 256–287; 399–415. With 21 figs. [53 refs.]

[15] ELLIOT (R. H.). Some Points in Connexion with Cataract Extraction.—*Brit. Med. Jl.* 1929. Dec. 21. pp. 1147–1149.

[16] O'BRIEN (C. S.). Akinesis during Cataract Extraction.—*Arch. of Ophthalm.* 1929. Apr. Vol. 1. No. 4. pp. 447–449. [5 refs.]

General Diseases.—*Leprosy.*—Hoffmann[17] has found a choroiditis present in the eyes of a patient whom he believed to be a sufferer from leprosy in a latent form. He suggests that such a focal affection of the choroid does not represent a direct reaction of the tissues to the specific germ, but rather an allergic process, produced by the toxins of decaying Hansen bacilli in other parts of the body. And that in countries where leprosy is endemic this disease should be taken into consideration as a possible causal factor in those cases of choroiditis which would ordinarily be reckoned tuberculous although no definite tubercular infection was demonstrable.

Tularemia.—Judd[18] has reported two cases of tularemia of the conjunctiva. The first occurred in a woman aged 29 who, forty-eight hours after skinning some apparently healthy rabbits, developed an attack of fever. This was accompanied by an inflammation of the right eye and by swollen glands on the same side of her neck. The conjunctival lining of the lower lid showed six circumscribed ulcers with yellow necrotic centres. Constitutional symptoms persisted for a considerable period, but the eye lesion healed in the course of a few days. The second was a man aged 42, inoculated by having sustained a scratch on a finger from a bone of a rabbit he was dressing. Constitutional symptoms appeared four days later. His left eye developed a dendritic corneal ulcer with mild iritis, but glandular enlargement was absent. Agglutination tests were positive for *B. tularense* in both cases.

Miscellaneous.—Kirwan[19] thinks that in Bengal a large proportion of cases of chronic cyclitis, episcleritis, primary and secondary glaucoma, choroiditis and optic atrophy are associated with *intestinal infections* by protozoa and flagellates, and such are nearly always accompanied by a chronic colitis. Other sources of infection in these patients cannot be detected. The benefit obtained from suitable treatment suggests that the significance of such an association may be important.

Rousseau[20] has given an account of the ophthalmic hospitals in Indo-China. In Tonkin and Annam there are hospitals which will accommodate from fifty to a hundred patients. In these districts trachoma is the principal incapacitating disease and is responsible for nearly 40 per cent. of blindness. Cataract occurs about five times as commonly as glaucoma. In Cochin China the chief institutions are at Saigon and Cholon. Gonorrheal ophthalmia is rife in these places, and is a frequent cause of blindness. Trachoma is said to affect between 20 and 25 per cent. of the native population. This is rather a lower rate than in Annam and Tonkin, where it reaches between 40 and 60 per cent. In this part of the world purulent conjunctivitis is evidently very common and with trachoma occasions a loss of sight relatively very great.

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17 Hoffmann (W. H.). Choroiditis in Latent Disease. — *Jl. Trop. Med. & Hyg.* 1929. Nov. 15. Vol. 32. No. 22. pp. 328–330. [4 refs.] [Finlay Inst., Havana, Cuba.]

18 Judd (J. Hewitt). Ocular Lesions in Tularemia. Report of Two Cases.—*Arch. of Ophthalm.* 1929. Sept. Vol. 2. No. 3. pp. 300–304. [12 refs.]

19 Kirwan (E. W. O'G.). Abdominal Sepsis as a Cause of Eye Disease. [Correspondence.]—*Brit. Med. Jl.* 1929. Sept. 28. p. 597.

20 Rousseau (Maurice). Les Instituts d'Ophtalmologie en Indochine.—*Rev. Prat. Malad. des Pays Chauds.* 1929. Sept. Year 8. Vol. 11. No. 9. pp. 416–418, 421–424, 427–430, 432–434.

HUISMAN[21] was deputed by the Dutch Government to make an enquiry into the prevalence of blindness in the district near the mouth of the Tjitaroem river in Java, as rumours stated that this was excessive. Out of 942 persons examined, 4 suffered from active trachoma, 6 from cataract and 46 from other diseases. Only 2 persons were blind. He concluded, therefore, that the rumours were greatly exaggerated and that trachoma in particular was rare in the district.

REVIEWS.—The *National Medical Journal of China* has devoted its October number exclusively to a discussion of the diseases of the eye met with in China. This is an encouraging recognition of the essential part which a good knowledge of ophthalmology plays in rendering efficient the work of doctors practising in countries remote from western civilization. Several interesting and important papers have been contributed, and these furnish striking evidence of the progress made in China in the study of the subject. Professor Arnold PILLAT writes concerning the disasters which so often follow treatment by quacks and the use of irritant medicine by "wise women" and others—a familiar subject to those accustomed to Indian conditions. Acupuncture appears to be a favourite form of treatment, and septic wounds of the eyeball are a common consequence. Pseudo-pterygia, symblepharon and ectropion often result from excisions of a portion of the conjunctiva unnecessarily performed. The same writer describes an extension of the limbus on to the upper nasal quadrant of the cornea which is quite commonly seen in otherwise normal Chinese eyes. This condition, when the limbus becomes hypervascular in any simple form of conjunctival inflammation, might easily be confounded with a trachomatous pannus. C. H. CHOU reports some rare injuries of the cornea and furnishes an account of his findings in 312 lenses of Chinese patients examined with the slit-lamp. Coronary cataract was found in 46 per cent. of males and in 27 per cent. of females examined. PILLAT's description of his experiences in a small military camp of 3,000 troops suggests that an adequate supply of cod-liver oil would prove little inferior to military tanks in improving the efficiency of the numerous Chinese armies in the field. 209 soldiers complained of eye trouble and 43 per cent. of these suffered from one of the various eye conditions associated with a deficiency of vitamin A. It is noteworthy that such signs of malnutrition were only observed amongst the rank and file. 99 per cent. of these are stated to have been suffering from trachoma!

The *Bulletin of the Ophthalmological Society of Egypt* for the year 1929 evidences the very healthy state of the Society by the number and quality of papers published by its members. Many of these concern trachoma and its complications, and the conjunctival inflammations so common in the country. The use of subconjunctival injections of phenolaine (1·5 cc. of a 0·4 per cent. solution) in the treatment of corneal nebulae is referred to by WILSON and ANIN BEY. Both speak favourably of the treatment, but the former admits that the good results must be accepted with reserve as it is so difficult to eliminate other factors which might tend to aid absorption. RIAD describes the superficial keratitis which he found associated with dengue. BARRADA believes that both sympathetic ophthalmitis

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[21] HUISMAN (B.). Verslag van het oogonderzoek van de bevolking aan de monding van de Tjitaroem.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Aug. 1. Vol. 69. No. 8. pp. 787–792. With 1 map in text.

and latent infection after trephining are rare in Egypt. ZAKI, on the other hand (p. 77), considers that sympathetic ophthalmitis is common in the country, but that it often escapes diagnosis.

The Ophthalmological Laboratory at Giza is a Memorial to the men of the Egyptian Labour Corps and Camel Transport Corps who lost their lives when serving with the Allied Armies during the Great War. It is due to MACCALLAN'S energy and enterprise that the Memorial took this very appropriate form, and a very fine laboratory for pathological study and research in connexion with diseases of the eye now commemorates the dead in their country where such disease is particularly rife. The third Annual Report for the year 1928 contains much information regarding its activities, with accounts of interesting cases seen. It is stated that the established ophthalmic hospitals have very largely reduced the amount of blindness in the country and that the reduction is steadily progressive. Also that "in Egypt the principal cause of blindness is undoubtedly gonococcal ophthalmia and not trachoma." Intramuscular injections of milk have been found to be a most valuable therapeutic agent in the treatment of gonococcal ophthalmia. Fresh cow's milk is boiled for three or four minutes and, after being allowed to cool to body temperature, it is skimmed. The dosage employed is 1 cc. of milk for each year of life [presumably up to a maximum of 10 cc.]. The injections appear to be made daily. WILSON furnishes an account of a follicular conjunctival inflammation produced in monkeys by an organism which resembles that described by NOGUCHI. He is not convinced, however, that the disease is true trachoma.

The 15th and 16th Annual Reports of the Ophthalmic Section, Department of Public Health, of the Egyptian Government for the years 1927 and 1928 are inspiriting, and show how well maintained is the progress in the care of the sufferers from eye diseases in Egypt. The number of ophthalmic units in the country at the end of 1928 reached 41, of which 27 are permanent and 14 are travelling. New patients numbered 381,790, an increase of 10 per cent. The percentage of blindness amongst the general population is said to show a gradual fall during the past ten years. The gonococcus is the predominant cause of acute ophthalmia and is present in 39 per cent. of infections. A chart shows how closely a period of the hottest weather coincides with the maximum number of patients treated. It is noteworthy that the number of sufferers from primary glaucoma (4,683) nearly equalled that of those affected by senile cataract (4,767).

H. Kirkpatrick.

REVIEWS AND NOTICES.

GIGLIOLI (George) [M.D. (Italy), D.T.M. & H. (Eng.), Chief Medical Officer to the Demerara Bauxite Co., Ltd., British Guiana]. **Malarial Nephritis. Epidemiological and Clinical Notes on Malaria, Blackwater Fever, Albuminuria and Nephritis in the Interior of British Guiana, based on Seven Years' Continual Observation.**—pp. x+164. With 17 illustrations (1 map). 1930. London: J. & A. Churchill, 40, Gloucester Place, Portman Square. [8s. 6d.]

British Guiana extends from 1°–9° N. Lat. It has a rainfall of about 100 inches annually, somewhat less at Georgetown, and nearly half as much again in the mountainous districts, while in the far interior the rainfall is only about 50 inches. In the mountainous districts there are two rainy seasons, May to August and December to January, while in the far interior there is only one, May to September. The temperature is about 80° with a mean diurnal range of about 10°. British Guiana would seem to present unusually favourable conditions for the study of the epidemiology of malaria, for proceeding from the coast to the interior we pass through four zones in which the physical features are very different. Thus we have (1) the coastal zone of cultivated alluvium, in part below high water level, with a network of drains, dams and pumping stations. It is the populated zone containing eight-tenths of the population, which in 1927 was estimated at about 308,000; (2) the sand hill forest-covered zone: here the rivers are still tidal; (3) the mountain zone of valleys and rapids and falls, the zone that bars progress in the colony, and access to (4) the open savannahs, the rolling grassy plains of the far interior; these are reached on a journey of perhaps 100 miles.

Chapter I treats of the epidemiology in the interior of British Guiana, i.e., in the last three areas given above, the areas of the tidal rivers, of the flood and torrential rivers and of the savannahs. The author has had seven years' experience, and his results clearly indicate that a great amount of work still remains to be done in this almost unexplored territory in regard to malaria. His observations refer mainly, however, to the river districts of the interior. *A. argyritarsis* is the commonest anopheline and appears to be a carrier. It breeds from June to November and malaria appears to show a seasonal periodicity in relation to this. Its larvae occur in water, protected by overgrowth from direct exposure to the sun and disappear when jungle is cleared, though the water remains. Some details concerning malaria parasites are given in the table.

Malaria is defined as hyper-endemic in the tidal portions of the Guiana rivers. Thus on the Demerara river in 1926 OZZARD and the author found palpable spleens in nearly 100 per cent. of Boviander children under 15 years of age, and in 1926 a similar survey among Boviander and aboriginal Indian children gave a figure of 76 per cent. (The Bovianders are a mixed race containing European, South American Indian, and Negro blood.)

Part II is devoted to blackwater fever. In 1927, 19 deaths from blackwater fever were registered officially; this would indicate about 100 cases on a basis of a 20 per cent. mortality. The author in the interior has seen 56 cases (in 7 years ?). The rise in the number of cases appears to follow the epidemic malaria rise in about 10 months (fig. 4). It is to be hoped that the chart can be continued so as to avoid a mere chance relationship.

An interesting feature is, that of his 56 cases, 33 occurred in children under 15. He gives five examples also of its occurrence in several members (nearly all children) of the same family. He suggests that this means either a house infection or a family idiosyncrasy. Among the 56 cases there were 9 deaths, a mortality of about 16 per cent. The disease occurred in individuals with a history ot persistent relapsing practically-untreated

malaria of many months' duration. The precipitating factors were exposure, chills, and alcohol. The influence of quinine in carrying on relapses in hospital was repeatedly noticed.

Part III is concerned with malarial albuminuria and nephritis. The author has studied 102 cases of subchronic or more commonly chronic dropsical or interstitial nephritis. He shows that the " endemic nephritis " of British Guiana is a preventable disease—it is, in fact, due to malaria, and in no case were other diseases beyond malaria in evidence. He emphasizes the influence of quartan as shown in the table in producing nephritis, but seems to have overlooked MacFie's paper on this subject.* The following table summarizes some of the parasite findings in different conditions.

Disease.	Cases : Parasites Positive.	*P. vivax* per cent.	*P. falciparum* per cent.	*P. malariae* per cent.
Malaria	1,247	81·4	15·7	2·9
Blackwater ...	19	79	21	—
Nephritis ...	58†	68·9	1·7	29·3

† Omitting 4 cases of double infections.

The table shows that the parasites found in blackwater are in almost the same rates as in malaria with a slight bias towards *P. falciparum*, whereas in nephritis the influence of quartan is conspicuous.

The book, though short (164 pp.), is an interesting one, and will repay careful reading. The author is to be congratulated in making good use of the cases that came under his observation.

J. W. W. Stephens.

Banerjee (Dhirendra Nath) [M.B. (Cal.), M.D. (Berlin), etc.]. **Text Book of Pathology including Bacteriology, Animal Parasitology, Laboratory Methods and Laboratory Diagnosis of Diseases.** Second Edition. Revised and Enlarged.—pp. xvi+646. With 305 illustrations & 9 coloured plates. 1929. Calcutta: The Medical Bureau, 199 Cornwallis Street. [Rs. 12.]

It is not an easy task to write a work on pathology to compass the special subjects of bacteriology, protozoology, animal parasitology, histology, cytology and immunity. More difficult still must it be to present these subjects in what must, we presume, be to some extent a foreign language to the author. Nor do we think that the task has been accomplished to the satisfaction, say, of the specialist. There are numerous misspellings, mistakes of expression, doubtful definitions and misstatements throughout the book. These could be eliminated from the next edition with the assistance of colleagues and fellow workers. With that criticism, we may come to the consideration of the main purpose of the book. Indian students have not, as a rule, the means to spend on expensive text books. In this work they have presented a comprehensive treatment of fundamental pathological subjects which are necessary to the clear understanding of medicine and at a very moderate price. It is printed on good paper and there are numerous illustrations. Some of the illustrations, especially the photomicrographs, are not good, but this is a fault which can be found with many books. Authors are very apt to use photographs of too low power to be worth reproducing. The illustrations are, as they

* Macfie & Ingram, *Ann. Trop. Med. & Parasit.*, 1917. Vol. 11, pp. 1–26. Briefly noticed in this *Bulletin*, 1917. Vol. 10, p. 154.

ought to be, drawn from Indian sources. It is a noticeable feature of many of these that they portray advanced conditions such as are seldom met with in Western countries. Some of these illustrations are of large scale, frozen sections of whole organs and so thin that they admit of the use of oil immersion lenses. These sections can only be a tribute to a highly specialized technique. It is generally considered a fine performance by a select few to obtain paraffin sections of whole organs with an order of thickness of 6 to 10 microns, while collodion sections are much thicker.

In the treatment of his subject the author has not by any means followed conventional lines. Some interesting chapters on the history and evolution of pathology, its mode of study and scope are introductory to the more detailed consideration of the various subjects. They stamp the work as one on a higher plane than a text book intended simply to meet the needs of examination. Nevertheless, it may be found necessary in the future to sacrifice some of the introductory matter in order to incorporate new and important facts.

W. F. Harvey.

RAY (Kumud Sankar). **Some Problems of the Medical Profession in India. Compiled for the All-India Medical Association.**—88 pp. Calcutta. The Indian Daily News Press.

ROY (B. C.). **Presidential Speech at the All-India Medical Conference, Lahore.**—10 pp. 1929. Dec. 27.

NAUTH (Bhola). **All-India Medical Conference. Held at Lahore, 27th and 28th December 1929.**—61 pp. 1929.

Resolutions passed at the All-India Medical Conference. Sixth Session, held at Lahore, 27th and 28th December, 1929.—7 pp.

The objects of the All-India Medical Association are: To protect the interests of its members; to protect the interests of national health, of medical education and research throughout the country. This is an excellent programme and we wish it success. Looking down the list of President, officers, and a fairly large council we meet with only one European name, and no Mohammedan name at all. The "Problems" contains an address by Sir Nilratan Sircar delivered in 1928 and another address of the same year by the then President, Dr. G. V. Deshmukh. In spite of noble aims there is throughout nearly all these documents a spirit of grievance and complaint, complaint against the ways of Government and especially against the "I.M.S." and its so-called privileges in civil employ. These, according to Resolution No. 3, "should be stopped at once, and I.M.S. and I.M.D. officers should be made to revert to the military side." Dr. Deshmukh writes: "the name of science and research is being degraded to suit the convenience and profit of the foreign medical agency in India." Col. Bhola Nauth does not altogether approve of things as they are, but his excellent address contains a paragraph which breathes a different spirit: "Without going into heroics as the British Medical Association has been doing over the glorious traditions of the I.M.S. and the good work which it has done in awakening a medical and sanitary conscience in India, it is sufficient to note that your gathering here to-day is an eloquent proof, if proof were needed, of the tribute of respect and gratefulness which the sons of India owe to the I.M.S." Another cause of complaint is the control permitted to the English General Medical Council. There is a general desire for an All-India Medical Council. A bill introduced to provide for such a Council was dropped. It has lately been revived and will no doubt be passed. A third complaint, with which we can sympathize, is against the proposed Research Institute at Dehra Dun and the abolition of the old and well-known Institute at Kasauli. The 6 lakhs required to build and prepare the Dehra Dun Institute will

take from the Indian Medical Research Association large sums which have up to now been given as grants to other institutions doing good work, as, for instance, the "Calcutta School of Tropical Medicine." It is also pointed out that Dehra Dun is far away from large towns which supply from their hospitals the clinical materials so necessary for medical research. Dr. B. C. Roy in his address gives some excellent advice to the members of the "A.I.M.A." and other Indian medical men.

J. H. Tull Walsh.

MATHESON (Robert) [Professor of Entomology, New York State College of Agriculture, Cornell University]. **A Handbook of the Mosquitoes of North America. Their Structure. How they live. How they carry Disease. How they may be studied. How they may be controlled. How they may be identified.**—pp. xvii+268. With 25 plates & 1 coloured frontispiece & 23 text figs. London: Baillière, Tindall & Cox, 7 & 8 Henrietta Street, Covent Garden, W.C. 2. [25s.]

Professor Matheson has written a general account of the mosquitoes of North America which will certainly be very useful in that continent. He deals in detail with the external anatomy of the adult insect, and of the larva; very little appears to be known about the structural characters of the egg or the pupa. He proceeds to a general account of its biology and relation to human welfare. Chapters on control, with special reference to America, follow. More than half of the book deals with the systematics of the 120 species of mosquito occurring in the area which extends down to, but does not include, Mexico.

Apart from the value of the book to a worker in North America, I feel that any entomologist without particular knowledge of mosquitoes could use it and learn much from it. There are, for instance, a number of admirable line drawings showing details of the chaetotaxy and of the structure of the hypopygia of the males. With the book and a collection of named specimens, one could rapidly acquire a good knowledge of the diagnostic and systematic characters of the mosquitoes.

From the point of view of human welfare, two topics of considerable importance are discussed. The more obvious is malaria, which is not really grave except in a few places in the area under discussion. The more interesting topic is perhaps the breeding of mosquitoes in salt marshes. In temperate America, as in Europe, there are certain species of the genus *Aëdes* which breed exclusively in salt marshes, and which are so numerous and so persistent in pursuit of man that they militate against comfort wherever they occur in numbers. They seriously interfere with the proper enjoyment of places which without them would be holiday resorts, and they invade cities in such numbers as to cause annoyance to the inhabitants.

We may congratulate the author on his useful piece of work, well illustrated and adequately printed.

P. A. Buxton.

DALRYMPLE-CHAMPNEYS (W.). **Undulant Fever with Special Reference to Animal Sources of Infection and the Possibility of its Prevalence in England and Wales.**—*Ministry of Health. Reports on Public Health & Med. Subjects. No. 56.* 78 pp. With 10 figs. (7 on 4 plates). [457 refs.] 1929. London: H.M.S.O. [1s. 6d.]

This report, which contains an exhaustive investigation of the subject involving extensive examination of the literature (no fewer than 457 articles and pamphlets have been consulted), has already been fully reviewed in the *Bulletin of Hygiene.* As the title suggests, special reference is made

to animal sources of infection and the possibility of further spread of the disease in England and Wales. An historical introduction is followed by a careful clinical description of varying types of the disease. The differential diagnosis is discussed with special reference to enteric fever, Hodgkin's disease and tuberculosis. Laboratory diagnosis is then dealt with, including blood culture and urine culture, animal inoculation and general bacteriological and serological methods. The vexed question of the relationship between *abortus* and *melitensis* is discussed in considerable detail and various tests which have been employed for differentiation are referred to. Human infection from animals other than goats is dealt with at considerable length, and the report concludes with a careful analysis of cases of undulant fever which have occurred in England in persons who have never left the country or have not, at any rate, been abroad for some years previous to the onset of their illness.

D. Harvey.